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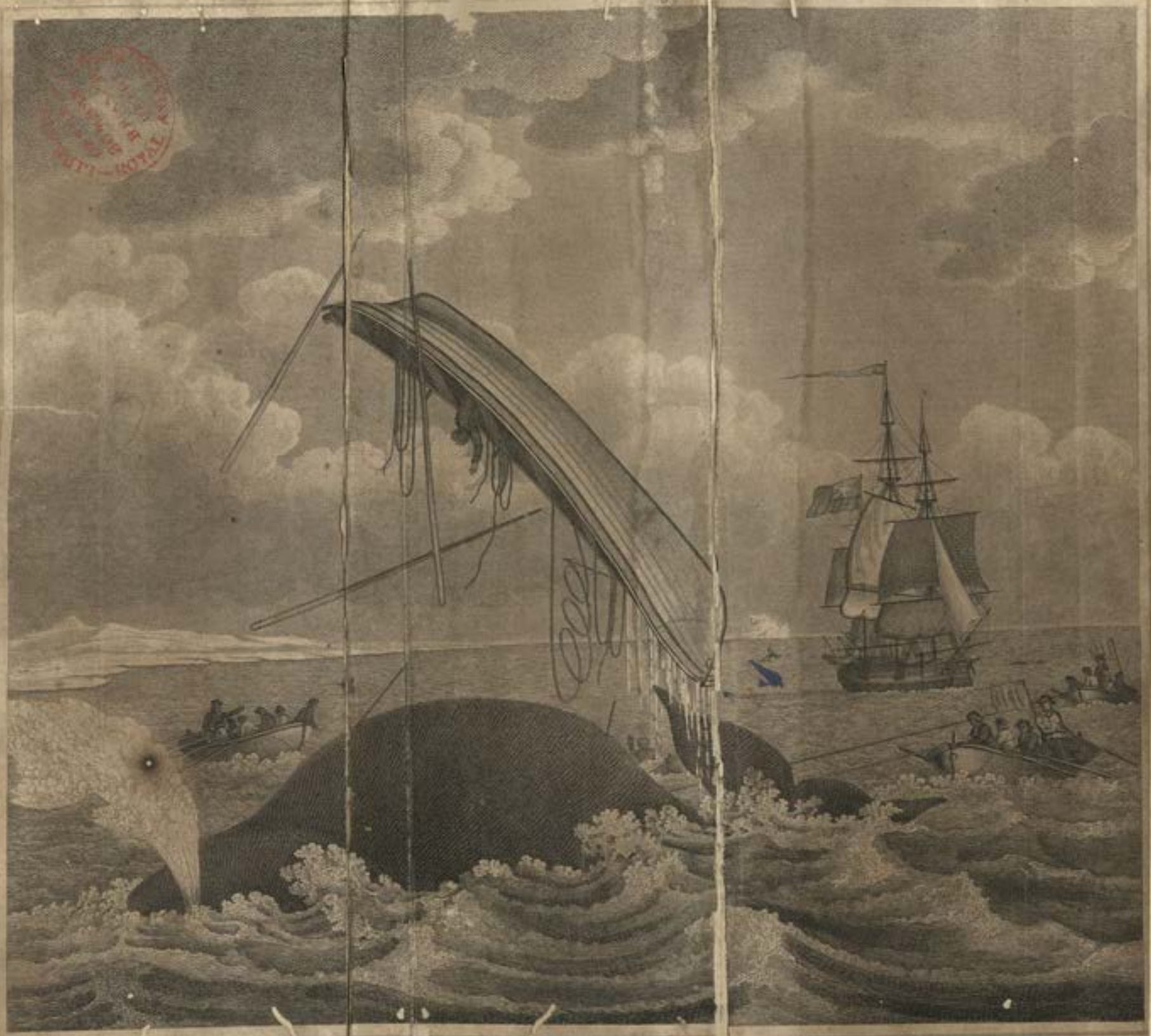

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DANGERS OF THE WHAL[illegible]HERY.

AN

ACCOUNT

OF THE

ARCTIC REGIONS,

WITH A

HISTORY AND DESCRIPTION

OF THE

NORTHERN WHALE-FISHERY.

84397

BY

W. SCORESBY *Jun.* F.R.S.E.

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ACCOUNT

OF THE

NORTHERN WHALE-FISHERIES,

&c.

CHAPTER I.

CHRONOLOGICAL HISTORY OF THE NORTHERN WHALE-FISHERIES.

In the early ages of the world, when beasts of prey began to multiply and annoy the vocations of man, the personal danger to which he must have been occasionally exposed, would oblige him to contrive some means of defence. For this end he would naturally be induced, both to prepare weapons, and also to preconceive plans for resisting the disturbers of his peace. His subsequent rencounters with beasts of prey would therefore be more frequently successful; not only in effectually repelling them when they should attack him, but also in some instances in accomplishing their destruction. By ex-

perience, he would gradually discover more safe and effectual methods of resisting and conquering his irrational enemies; his general success would beget confidence, and that confidence at length would lead him to pursue in his turn the former objects of his dread, and thus change his primitive defensive act of self-preservation into an offensive operation, forming a novel, interesting, and noble recreation. Hence we can readily and satisfactorily trace to the principle of *necessity*, the adroitness and courage evidenced by the unenlightened nations of the world, in their successful attacks on the most formidable of the brute creation; and hence we can conceive, that necessity may impel the indolent to activity, and the coward to actions which would not disgrace the brave.

If we attempt to apply this principle to the origin of the schemes instituted by man, for subduing the cetaceous tribe of the animal creation, it may not at the first sight appear referable to the exigence of necessity. For man to attempt to subdue an animal whose powers and ferocity he regarded with superstitious dread, and the motion of which he conceived would produce a vortex sufficient to swallow up his boat, or any other vessel in which he might approach it,—an animal of at least six hundred times his own bulk, a stroke of the tail of which might hurl his boat into the air, or dash it and himself to pieces,—an animal inhabiting at the

same time an element in which he himself could not subsist;—for man to attempt to subdue such an animal under such circumstances, seems one of the most hazardous enterprises, of which the intercourse with the irrational world could possibly admit. And yet this animal is successfully attacked, and seldom escapes when once he comes within reach of the darts of his assailer.

In tracing from a principle of necessity the progress of such a difficult and hazardous undertaking, from its first conception in the mind to its full accomplishment; in the existing deficiency of authentic records, much must be left to speculation. The following view may at least be considered as plausible.

It seems to be the opinion of most writers on the subject of the Whale-Fishery, that the Biscayans were the first who exercised their courage in waging a war of death with the whales, and succeeded in their capture. This opinion, though, perhaps, not correct, as will hereafter appear, is yet a sufficient foundation for investigating the probable origin of this remarkable employment. These people, like the inhabitants of almost all sea-coasts, were employed, principally, in the occupation of fishing. A species of whale, probably the *Balæna rostrata*, was a frequent visitor to the shores of France and Spain. In pursuit of herrings and other small fishes, these whales would produce a serious destruc-

tion among the nets of the fishermen of Biscay and Gascony. Concern for the preservation of their nets, which probably constituted their principal property, would naturally suggest the necessity of driving these intruding monsters from their coasts. With this view, the use of fire-arms, or, supposing the capture of these animals by the Basques and Biscayans to have been effected prior to the invention of gunpowder (A. D. 1330), which was probably the case, the use of arrows and spears would naturally be resorted to. On shooting at the whales, either by means of the bow or the musket, they would doubtless be surprised to find, that, instead of their being the ferocious, formidable, and dangerous animals they had conceived, they were timid and inoffensive. This observation would have a tendency to supply them with such additional confidence and courage, that the most adventurous, from motives of emulation, the prospect of profit, or even from a principle of fool-hardiness, might be induced to approach some individual of the species, and even dart their spears into its body. Perceiving that it evinced no intention of resistance, but that, on the contrary, it immediately fled with precipitation to the bottom of the sea, and that, on its return to the surface, it was quite exhausted, and apparently in a dying state; they might conceive the possibility of entangling some of the species, by means of a cord attached to a barbed arrow or spear. If, to the

end of this cord they attached one of the buoys used in their common fishing occupations, it would point out the place of the wounded animal, fatigue it in its motions, and would possibly goad it on to produce such a degree of exhaustion, that it might fall an easy prey to these adventurous fishermen. One of these animals being thus captured, and its value ascertained, the prospect of emolument would be sufficient to establish a fishery of the cetaceous tribe, and lead to all the beneficial effects which have in modern times resulted.

Historians, in general, it has been observed, have given to the Biscayans the credit of having first succeeded in capturing the whale upon the high sea. Those authorities, indeed, may be considered as unquestionable, which inform us, that the Basques and Biscayans, so early as the year 1575, exposed themselves to the perils of a distant navigation, with a view to measure their strength with the whales, in the midst of an element constituting the natural habitation of these enormous animals; that the English in 1594, fitted an expedition for Cape Breton, intended for the fishery of the whale and the walrus (*scahorse*), pursued the walrus-fishing in succeeding years in high northern latitudes, and in 1611 first attacked the whale near the shores of Spitzbergen; and that the Hollanders, and subsequently, other nations of Europe, became participa-

tors in the risk and advantages of these northern expeditions. Thus, according to these writings, 'the Basques and Biscayans, then the English, and afterwards the Dutch, were the nations who first practised the fishery for the whale. Some researches on the origin of this fishery, carried on in the northern seas, however, will be sufficient to rectify the error of these conclusions, by proving, that the whale-fishery by Europeans may be traced as far back, at least, as the ninth century *.

Oppien, in his treatise *de Piscatu*, has left some details of the ancient whale-fishery, which, however, we shall pass over; because he seems to refer principally, if not altogether, to the smaller species of whales of the genus *Delphinus*. We, therefore, go on to authority which is more respectable.

The earliest authenticated account of a fishery for whales, is probably that contained in Ohthere's Voyage by Alfred the Great. This voyage was undertaken about the year 890 by OHTHERE a native of Halgoland, in the diocese of Dronthein, a person of considerable wealth in his own country, from motives of mere curiosity, at his own risk, and under his own personal superintendence. His enterprise was communicated by the navigator himself to King Alfred, who preserved it, and has handed it

* NOEL.

down to us in his translation of Orosius *. On this occasion, Ohthere sailed to the northward along the coast of Norway, round the North Cape, to the entrance of the White Sea. Three days after leaving Dronthein or Halgoland, "he was come as far "towards the north, as commonly the whale-hunt-"ers used to travel †." Here Ohthere evidently alludes to the hunters of the walrus or seahorse; but subsequently, he speaks pointedly as to a fishery for some species of cetaceous animals, having been at that period practised by the Norwegians. He told the King, that with regard to the common kind of whales, the place of most and best hunting for them

* The work of Orosius is a summary of ancient history, ending with the year 417, at which period he lived. He was a Spaniard and a Christian. To this translation, Alfred added, of his own composition, a Sketch of Germany, and the valuable Voyages of Ohthere and Wulfstan, the former towards the North Pole, the latter into the Baltic Sea. The principal MS. of Alfred's Orosius, which is very ancient and well written, is preserved in the Cotton Library, Tiberius, b. 1. In 1773, the Honourable Daines Barrington published the Anglo-Saxon Orosius, with an English translation. His MS. was a transcript formerly made of this.—Turner's Anglo-Saxons, vol. ii. p. 282, 283, and 284.

† Hackluyt's Voyages, vol. i. p. 4. Turner's History of the Anglo-Saxons, vol. ii. p. 288.–296, reads, "Three days was "he as far north as the whale hunters farthest go."—"Da "ves he sva feor nord sva sva hoœl huntan fyrrest farad."

was in his own country; whereof some be 48 ells of length, and some 50, of which sort, he affirmed, that he himself was one of the six who in the space of three *(two)* days, killed threescore *. From this it would appear, that the whale-fishery was not only prosecuted by the Norwegians so early as the ninth century, but that Ohthere himself had personal knowledge of it. But when he affirms, that himself, with five men, captured 60 of these whales in two days, when it is well known that fifty men, under the most favourable circumstances, and in the present improved state of the fishery, could not have taken one-half, or even one-third of that number in the same space of time, of any of the larger species of whales,—we are naturally led to question the authenticity of the account, as far as relates to this transaction; and in questioning one part, throw a shade of doubt over the whole narrative. As, however, the voyage of Ohthere is a document of much value in history, both in respect to the matter of it, and the high character of the author by whom it has been preserved, it were well to examine carefully this circumstance, before we decide on a point so important. Hitherto I have followed Hackluyt; but if we refer to the original, we shall find, that Hackluyt himself, is probably, in this instance, the

* Hackluyt's Voyages, vol. i. p. 4.

occasion of the apparent inconsistency. Turner, in his "History of the Anglo-Saxons," gives a copy in the original language of this part of Alfred's Orosius, taken from the principal manuscript preserved in the Cotton Library. In reference to this passage, where the remarkable exploit of Ohthere is recorded, he observes, that the Saxon words of this sentence have perplexed the translators. He has ventured to give it some meaning, by supposing, that *syxa* is an error in the manuscript, and should be *fyxa*; by which alteration the passage reads, "On his own "land are the best whales hunted; they are 48 ells "long, and the largest 50 ells. There, he said, "that of *(fyxa) some* fish, he slew sixty in two "days *." Thus, the whale here referred to, might,

* The words of the original are, "Ac on his agnum lande "is se bets'ta hwœl huntath tha beoth ealta and feowertiges "elna lange, tha mæstan fiftiges elna lange, thara he sæde "thæt he syxa (or *fyxa*) sum of sloge syxtig on twam dag-"num." Turner's Anglo-Saxons, vol. ii. p. 292. *note.*

The Honourable Daines Barrington, in the account of Ohthere's Voyage, published in his "Miscellanies," translates the passage, containing his exploit in the whale-fishery, in the words, "That he had killed *some* six; and sixty in two days;" but, conscious of the unintelligibleness of the sentence, he observes in a note, that "*Syxa,*" he conceives, "should be a se-"cond time repeated here, instead of *syxtig* or sixty; it would "then only be asserted, that six had been taken in two days, "which is much more probable than sixty." (p. 462.)

possibly, be that species of Delphinus, so frequently driven on shore in great numbers at Orkney, Shetland, and Iceland, in the present age; where, in this way, a few small boats have been known to capture even a larger number than Ohthere speaks of, in one day. If so, though it does not contradict or explain away the fact, of larger whales having been likewise hunted and captured, it removes the objection as to the improbability of the exploit recorded, and enables us to adhere with greater confidence to our authority of the great antiquity of the whale-fishery by the Norwegians.

In various ancient authors, we have accounts of whales as an object of pursuit; and by some nations held in high estimation as an article of food. Passing over the notices of these animals by the classic authors as objects of peculiar dread, or as prognostics of peculiar events, I proceed to the consideration of those which mention the whale in the way of fishery or capture, as my more immediate object *.

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* For the following researches relative to the ancient history of the Whale-fishery, up to the middle of the sixteenth century, I am chiefly indebted to a "Mémoire sur l'Antiquité de "la Pêche de la Baleine par les Nations Européennes," by S. B. J. Noel, Paris, 1795, 12mo. The greater part of the references I have compared with the originals; and where the spirit of the language has been altered by the translations, I have endeavoured to correct it.

A Danish work *, which, there is reason to suppose, was written about the middle of the twelfth century, but, at any rate, of a date much earlier than that which we assign to the first fishery of the Basques, declares, that the Icelanders, about this period, were in the habit of pursuing the whales, which they killed on the shore, and that these islanders subsisted themselves on the flesh of some one of the species †. And Langebek does not hesitate to assert ‡, that the fishery of the whale *(hval-fangst)* was practised in the most northern countries of Europe, in the ninth century.

Whether the Normans, in the different invasions which they made on France, might have carried the method of harpooning and capturing the whale thither, or whether these processes, as I have before suggested, were known and practised by the fishermen inhabiting the Bay of Biscay before their incursions, is uncertain; nevertheless it would appear, that the French were not unacquainted with the business at a very remote period. Under the

* Kongs Skugg-sio, 121.

† The whale here referred to, is probably the species of Delphinus, usually called Bottle-nose, which is yet occasionally driven on shore by the inhabitants of Shetland, Orkney, Feroe, and Iceland.

‡ Langebek, *Rer. Dan. hist. med. ævi*, ii. 108.

date of 875, in a book, entitled the *Translation and Miracles of St Vaast* *, mention is made of the whale-fishery on the French coast. In the *Life of St Arnould, bishop of Soissons* †, a work of the eleventh century, particular mention is made of the fishery by the harpoon, on the occasion of a miracle performed by the Saint. Some Flemish fishermen had wounded, with strokes of their lances, a large whale, the capture of which they believed to be certain, when suddenly, regaining his strength, the animal struggled so violently, that he was on the point of escaping from them. At this critical juncture, they considered their only resource was to invoke the Saint, say their *légendaire*, and promise him a part of the fish, if he would be propitious in assisting them to subdue it. The offering was happily accepted; and, to their joy, the same instant, the whale is said to have suffered them to approach it, and without further resistance was killed, and drawn to the shore at the will of the fishers.

At this period, we have different authorities for supposing, that a whale-fishery was carried on near the coasts of Normandy and Flanders. We find, in the eleventh century, a donation of William the Conqueror, to the Convent of the Holy Trinity of Caen,

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* "Translation et des Miracles de Saint Vaast."

† "Vie de Saint Arnould, Evêque de Soissons."

of the tithe of whales captured at or brought to Dive *; and in a bull of Pope Eugene III. in 1145, we find again a donation in favour of the church of Coutances, of the tithe of the tongues of whales † taken at Merry, a gift which was confirmed to this church by an act of Philip, King of France, in 1319. Though there seems nothing in the words of these acts against the idea, that the whales here spoken of were fished for in the sea, but, on the contrary, they rather convey a belief, that the Normans, familiarised in the north with these hardy enterprises, never hesitated the repetition of them in the Channel, with a superiority of means and of courage derived from experience; yet, as hitherto, there is nothing decisive as to a fishery having been actually carried on by the French, I do not feel myself competent to speak positively to the point.

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* "Decimam Divæ,—de balenis et de sale," &c. *Gall. Christ.* xi. *instrum.* 59.

† ——— "Apud Merri, decimas *linguarum cenarum* quæ "capiuntur inter Tar et Tarel fluvios, &c.—decima *lignarum* "*crassi piscis* totius ripparіæ maris," &c. *Gal. Christ.* xi. *instr.* 240.–273. There are two serious errors in the text of these two charters. In the first we must read *cetarum*, instead of *cenarum*; and, in the second, *linguarum*, instead of *lignarum*, for establishing the sense, without which they will be unintelligible. These charters likewise indicate, that the people of Normandy were in the habit of eating the tongues of whales in Normandy.

The great D'Aussy, who has given a valuable work on the *private life of the French**, quotes a manuscript of the thirteenth century, where mention is made of the flesh of the whale being used for food. He also quotes a fable†, tending to prove the same point; and as he makes it appear, that the flesh, and particularly the tongue, was publicly sold in the markets of Bayonne, Cibourre, and Béariz, and that it was esteemed as a delicacy; it is presumed that it was sold in its fresh state, and that they took the whales at a little distance from the coast, in the manner practised in Normandy. In support of this opinion, it may be observed, that Edward III. King of England, had a revenue of 6*l.* Sterling, upon every whale taken and brought into the harbour of Béariz; which, in 1338, was so considerable, that it became the subject of petition by Peter de Puyanne, Admiral of the English fleet stationed at Bayonne, and it seems was awarded to him, in consideration of his services in the capacity of Admiral, in which he was employed ‡.

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* "La Vie privée des Français."

† "Bataille de Charnage et de Carême;"—"La Vie privée," &c. vol. ii. 66. 68.

‡ Rymer's "Fœdera." Tom. v. p. 46. 12. Edw. III.

Whilst the Norwegians, Flemings, French, and probably the Spaniards of Biscay, seem to have thus early subjected to their necessities or ambition, the largest animals in the creation, the English, it is not to be expected, remained long behind. We possess, indeed, few documents, which relate to any very early attempts to capture the whale by the English; and those we have, leave us rather in doubt whether the whales therein referred to, were such as were run on shore by accident, or whales attacked and subdued upon the high sea. By an act of Edward II. * A. D. 1315, in an agreement with Yolendis de Soliere, Lady of Belino, he reserves to himself the right of all whales cast by chance upon the shore; and, by a subsequent act, (A. D. 1324.) the wreck of whales throughout the realm, or whales or great sturgeons *taken* in the sea, or elsewhere, within the realm, excepting certain privileged places, were to belong to the King †. Another

* Rymer's Fœdera, tom. iii. p. 514. and 515. An. 8. Edward II.

† "Item habet warectum maris per totum regnum, balenas et sturgiones captos in mari vel alibi infra regnum, exceptis quibusdam locis privilegiatis per Reges." Cotton. MS. 17. Edward II. c. 11.

act recorded by Dugdale *, expresses, that Henry IV. gave, in 1415, to the Church of Rochester, the tithe of whales taken along the shore of that bishoprick.

The whale-fishers of the sixteenth century, who most distinguished themselves by their habitual success in capturing those formidable creatures which constituted the objects of their pursuit, were the inhabitants of the shores of the Bay of Biscay. On the French side, the fishers of Cape Breton, of Plech or Old Boucaut, the Basques of Béariz, of Gattari, St Jean-de-Luz, of Cibourre, &c., and the Biscayans, on the side of Spain, are all understood to have been actively engaged in attacking the whales, whenever they appeared in the Bay of Biscay †; and with almost uninterrupted success. The animal, however, captured by these people, was not the great Mysticetus or common whale, but a species of Fin-whale, probably the Balæna rostrata of Linnæus, as appears both by the testimony of the Dutch ‡, and by

* "Henricus rex Anglorum, Anselmo Archiepiscopo, &c. "Sciatis nos dedisse S. Andreæ de Rovecestra, &c.—Et deci- "mam Balenarum quæ captæ fuerint in Episcopatu Rofen- "si."—Monas. Angl. i. 30.

† Noel, Mémoire, &c. p. 11.

‡ "Nieuwe Beschryving der Walvisvangst en Haringvissche- "ry," vol. i.

the known habits of the common whale, which has never yet been seen in the European seas, as far as I can learn, but only in or very near the regions of ice. Besides, the food of the mysticetus does not seem to occur in the necessary profusion except in the Polar Seas. The fin-whales, on the contrary, which feed in general on herrings and other white fish, find large supplies of food in most parts of the North Sea and Atlantic Ocean.

At first, these animals used to present themselves in the Bay of Biscay, at a certain season every year, when they were attacked by the Biscayans. At length, however, when the capture of them became a particular object of industry, and the whales were disturbed and became less abundant, with a desire also, it appears, of enjoying a more uninterrupted fishery, the Biscayans insensibly became bolder, and being good navigators, anticipated their return by pursuing them when they left the Bay, until they ultimately approached the coasts of Iceland, Greenland and Newfoundland*. The Icelanders, now attracted by a prospect of a new branch of commerce, fitted out vessels, and uniting their energies with those of the Biscayans, conducted the whale-fishery on so extensive a scale, that, towards the end

* Beschryving der Walvisvangst, vol. i. p. 1.

of the sixteenth century, the number of vessels annually employed by the united nations, amounted to a fleet of 50 or 60 sail*.

The first attempt by the English to capture the whale, of which we have any satisfactory account, was made in the year 1594. Different ships were fitted out for Cape Breton, at the entrance of the Gulf of St Lawrence, part of which were destined for the walrus-fishery, and the remainder for the whale-fishery. The Grace of Bristol, one of these vessels, took on board 700 or 800 whale-fins or laminæ of whalebone, which they found in the Bay of St George, where two large Biscayan fishermen had been wrecked three years before. This is the first notice I have met with of the importation of this article into Great Britain†.

However doubtful it might have appeared at one time, whether the English or the Dutch were the first discoverers of Spitzbergen, the claim of the English to the discovery and first practice of the whale-fishery on the coasts of these islands, stands undisputed‡.

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* Beschryving, vol. i. p. 1.

† Hackluyt's Voyages, vol. iii. p. 241.

‡ The Dutch allow that the English preceded them to the Greenland or Spitsbergen whale-fishery, four years.—Beschryving der Walv. vol. i. p. 2.

Out of the several attempts which had been made to find a passage on the north of Europe or America to the East Indies, arose the Archangel trade; for the prosecution of which, the Russia Company was established under an advantageous charter. The active prosecution of this trade, and the annual fishery about the North Cape and Cherry Island, for the walrus, so inured the English to these boisterous and frigid regions, that, on the retreat of the objects of their pursuit, they extended their voyage (which had usually terminated at Cherry Island) to the northward, along the coast of Spitzbergen, where they resigned the capture of the walrus and seal, for the more important fishery of the whale.

The discovery of the Greenland whale-fishery, it therefore appears, was not a circumstance that immediately resulted from the prior discovery of Spitzbergen, but it arose out of the enterprising character of the adventurers, employed in commercial speculations at this period; which character would, most undoubtedly, have led them to follow the objects of pursuit, when they retreated to the northward, independent of the existence of these islands. Hence, whatever importance is attached to the discovery of these barren lands, the value of the discovery is eclipsed by that of the whale-fishery in the prolific seas adjacent; as it in a short time proved the most lucrative, and the most important branch

of national commerce, which had ever been offered to the industry of man.

The merchants of Hull, who were ever remarkable for their assiduous and enterprising spirit, fitted out ships for the whale-fishery so early as the year 1598*; which they continued regularly to prosecute on the coasts of Iceland and near the North Cape, for several years; and after the re-discovery of Spitzbergen by Hudson in 1607, they were among the first to push forward to its coasts.

Captain Jonas Poole was sent out on a voyage of discovery in the year 1610, by the "*Company "for the Discovery of unknown Countries*," the "Muscovy Company," or the "Russia Company," as it was subsequently denominated. When unable to proceed farther to the northward, he returned to Spitzbergen, and employed himself some time in killing sea-horses, in order to reduce the expences of the voyage. Having observed a vast number of whales on the coast, he mentioned it to the company after his return, who, the next year, fitted out two ships for the fishery; the Marie Margaret of 160 tons, under the direction of Thomas Edge, *factor*, and the Elizabeth of 60 tons, Jonas Poole, master. Edge had six Biscayans along with him, expert at killing whales, and his ship was fur-

* Elking's View of the Greenland Trade and Whale-fishery, p. 41.

nished with the requisite apparatus for the fishery. About the 12th of June they killed a small whale, which yielded twelve tons of oil, being, according to Captain Edge, the first oil ever made in Greenland. Whilst they were busily engaged killing sea-horses in Foul Sound, and preparing the oil, a quantity of ice set in, whereby the ship was driven on shore and wrecked. The men being now totally destitute, the Elizabeth having parted company before this accident, took to their boats on the 15th of July, and proceeded along shore thirty or forty leagues to the southward. Two boats parted company off Horn Sound, and shortly afterwards fell in with a Hull ship, which happened to be on the coast, and gave the master intelligence, that they had left 1500*l.* value of goods in Foul Sound. He therefore proceeded to the place to get the goods belonging to the company, as well as to kill some morses for himself. Meanwhile, Captain Edge, with two other shallops, had put off shore in lat. $77\frac{1}{2}^{\circ}$ for Cherry Island, and landed there with a N. W. storm on the 29th of July, after being fourteen days at sea. Here, they were so fortunate as to find the Elizabeth, just on the point of weighing anchor for England; which ship having made a bad voyage, Edge ordered her back to Foul Sound, to take on board the goods left there. They left Cherry Island on the 1st of August, and arrived in Foul Sound on the 14th, where they found the Hull ship

and the rest of their men. Captain Edge now ordered the cargo of the Elizabeth, consisting of sea-horse hides and blubber taken at Cherry Island, of little worth, to be landed, and the oil and whale-fins procured by his own crew to be taken in. In performing this, they brought the ship so light that she upset and was lost. Captain Edge then agreed with Thomas Marmaduke, master of the Hull ship, to take in the goods saved, at the rate of 5*l. per* ton, which being done, they set sail homewards on the 21st of August, and arrived in Hull on the 6th of September, from whence the company's goods were shipped for London*.

This was the first instance in which the Russia Company embarked in the whale-fishery at Spitzbergen†.

Though the English had thus by rapid steps discovered and established a whale-fishery on the coasts of Spitzbergen, of vast national as well as private

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* Edge's "English and Dutch Discoveries,"—PURCHAS'S "Pilgrimes," vol. iii. p. 467.

† Anderson, in his History of Commerce, under the year 1597, mentions, that the Russia Company now commenced the fishing for whales near Spitzbergen. It is evident, however, that the Spitzbergen fishery did not commence so early by several years; and it is probable that the voyage of Edge, in 1611, was the first of the fishery on this coast.

value, yet they had an opportunity of reaping but little benefit from the trade before other nations presented themselves as competitors.

Such a novel enterprise as the capture of whales, which was rendered practical, and even easy, by the number in which they were found, and the convenience of the situations in which they occurred,—an enterprise at the same time calculated to enrich the adventurers far beyond any other branch of trade then practised—created a great agitation, and drew towards it the attention of all the commercial people of Europe. By one impulse, their mercantile spirit was directed to this new quarter, and vessels from various ports were engaged, and began to be fitted for the fishery. In the next year, however, when the Russia Company sent two ships, the Whale of 160 tons, and the Sea-Horse of 180 tons, to the fishery, three foreign ships only made their appearance. They consisted of one from Amsterdam, commanded by William Muydam, and another from Sardam, intended only, it seems, for the taking of sea-horses; and a Spanish ship from Biscay, fitted for the whale-fishery *. The English, jealous of the interference of the Dutch ships which they encountered during the voyage, (who now, as on many former occasions, followed them closely wherever there was presented a prospect of emolu-

* De Bry's Ind. Orientalis, tom. iii. p. 51.

ment *,) would not allow them to fish, but obliged them to return home, threatening to make prizes of their ships and cargoes if ever they had the presumption to appear again on the fishery †. They conceived themselves to be justifiable in this conduct, from the supposition that the discoverers of Spitzbergen, as they considered themselves, and its whale-fisheries, were entitled to all the emoluments to be derived from them. The Dutch vessels ‡ which, on this occasion, were repulsed from the fishery, were piloted by a man who had been twenty years in the service of the Russia Company; and the Spanish vessel which the same year attempted the Spitzbergen fishery, was piloted by an-

* "In most of the new branches of trade discovered by the "English, in the latter part of the sixteenth, and the former "part of the seventeenth century, we may observe, that the "Dutch followed close at their heels. This has been seen in "the Russia Trade,—the N. E. and N. W. attempts for a pas-"sage to China,—in planting America,—in the circumnaviga-"tion of the globe,—and in the East India Commerce."—MACPHERSON'S Annals of Commerce, vol. ii. p. 264.

† Elking's View of the Greenland Trade and Whale-fishery, p. 41.

‡ Most authorities mention only one Dutch vessel as having sailed to Spitzbergen this year; but, as De Bry, who mentions two vessels, wrote his account in the following year, I have preferred his authority to any other.

other of the company's servants, and procured a full cargo in Green Harbour. Woodcock, the pilot, on his return to England, was, on the complaint of the company, imprisoned sixteen months in the Gatehouse and Tower, for conducting the Spanish ship to the fishery *. On this voyage the Russia Company's ships made no discoveries, in consequence of some quarrelling between the commanders; they, however, succeeded better in the fishery, having taken seventeen whales and some sea-horses, which produced them 180 tons of oil.

In the following year (1613), the English Russia Company having received intimation that a number of foreign ships were fitting for Spitzbergen, obtained a Royal Charter, excluding all others, both natives and foreigners, from participating in the fishery; after which they equipped seven armed vessels, under the direction of Captain Benjamin Joseph, in the Tigris of 21 guns, for the purpose of enforcing this prerogative, and monopolizing the trade.

Though the foreign adventurers were apprized of the resistance intended by the English, yet they all persisted in their object, and proceeded openly on the voyage; excepting some vessels from Biscay, which put to sea under pretence of being bound to

* Purchas's "Pilgrimes," &c. vol. iii. p. 467.

the West Indies, to carry out men to Lima, by order of the King of Spain; but eventually made their way to the coast of Spitzbergen. Thus, in the course of the season, there appeared in the fishing country two Amsterdam ships, furnished with twelve Biscayans, as harpooners, boat-steerers, and oil manufacturers, and two more from other ports of Holland; together with a pinnace, partly manned with English, fitted from Amsterdam, for the walrus-fishery; one ship and a pinnace also arrived from Dunkirk, one from Bourdeaux, one from Rochelle, three from St Jean de Luz, and some Spanish ships from St Sebastian. These vessels being successively discovered by the English in their various retreats, were attacked in the way they had reason to anticipate; and after the greater proportion of the blubber or oil, and whale-fins, which they had procured, was taken from them, most of them were driven out of the country. Even four English ships, fitted out by private individuals, were likewise driven away, to which, in common with the foreigners, the Russia Company's people attached the name of *interlopers*. Some French ships only were permitted to fish, in consideration of their paying to the English a tribute of eight whales; and one ship belonging to the same nation, which had been successful in the fishery, was allowed to retain half of the blubber it had taken, on condition of reducing the other half

into oil for the English, who were not so well acquainted with the process of manufacturing this article as the French. The Dutch vessel which had English seamen on board, was captured and taken to London *, together with the greater part of eighteen and a half whales, which their other ships had procured, occasioning a loss, according to their estimation, of 130,000 guilders †. The English, however, were far from being gainers by these transactions; for whilst engaged in making reprisals on their competitors, they neglected their own voyage, whereby their ships returned home 200 or 300 tons *dead* freight, and occasioned a loss to the company

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* The Dutch, in their modern publications on the whale-fishery, are silent on the subject of this capture; as also is Captain Edge, who has given us an account of the early fishery of the English, in Purchas's Pilgrimes, &c. in which he himself was engaged. I therefore presume, that the prize, on its arrival in England, was restored to its proper owners.

† "Beschryving der Walvisvangst," &c. Deel i. p. 25., and "Ind. Orientalis," by John Theodore de Bry, A. D. 1619, where we have a full account of the transactions above referred to, in a chapter entitled "Descriptio regionis *Spitzbergæ*; "addita simul relatione injuriarum, quas, An. 1613, alii pisca- "tores ab Anglis perpessi sunt: et protestatione contra Anglos, "qui sibi solis omne jus in istam regionem vendicarunt."—tom. iii. p. 47, 62.

of three to four thousand pounds *. But though the Dutch made a dreadful outcry against the proceedings of the English, we find the latter affording assistance and protection to some of the crew of a Dutch vessel who had been separated from their ship in a fog, whilst engaged, in opposition to the orders of the English Admiral, in conveying away from the land the produce of a whale they had taken †: and we also find, that while the Dutch were highly indignant at the opposition received from the English, yet they themselves assumed the same right over some Spanish vessels which entered the Sound where they lay, by prohibiting them from fishing, and forcing them to depart ‡.

The Dutch, who constantly exhibited an uncommon degree of perseverance in all their commercial undertakings, were not to be diverted from participating in so lucrative a branch of commerce, without a struggle, made an attempt, in 1614, to continue the trade, notwithstanding their discouragement, on a plan so extensive, as to combine the resources of the principal cities and sea-port towns of the United Provinces. In the first instance.

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* Purchas's "Pilgrimes," &c. vol. iii. p. 467.

† De Bry, tom. iii. p. 59.

‡ Idem, vol. iii. p. 58.

however, the plan was only got to bear in Amsterdam, where a company was established. In consideration of repeated petitions to the States-General, setting forth the great expences incurred by the merchants composing this company, in discovering the countries situated in the polar regions, and in commencing a whale-fishery therein, they obtained a charter for three years, granting them the right of all the fisheries, and other emoluments, included between Nova Zembla and Davis' Straits, and excluding all other ships of the realm from interference, under the penalty of confiscation of the ships and cargoes *.

With this encouragement, they immediately sent to Biscay for additional harpooners, to assist and instruct them in the fishery; erected boiling-houses, warehouses, and cooperages, to be in readiness to reduce the fat into oil, in the event of a successful fishery; and, for the security of their ships, they sent along with them, four ships of war, of thirty guns each, which, together, amounted to a fleet of eighteen sail. This fleet was so formidable, that the English, notwithstanding their pretensions to an exclusive claim to the fishery, having only thirteen large ships present, and two pinnaces, though furnished with artillery, were obliged to allow the Hollanders to fish without interruption. The English got but

* Beschryving der Walvisvangst, vol. i. p. 2, 3.

half laden, and the Dutch made but a poor fishing *.

King James seems to have entertained the same opinion with regard to the title of his subjects, to the sole occupation of the Greenland Whale-fishery; or, at least, he wished to establish such a title, since, in the course of the same year, he sent Sir Henry Wootten, his ambassador extraordinary, to treat with the Commissioners of their High Mightinesses the States-General, concerning the intrusion of the Hollanders into the English Greenland fishery, together with their interruption of our East India Commerce †.

In 1615, the Russia Company fitted out but two ships and two pinnaces for the whale-fishery, while the Dutch sent out eleven, together with three ships of war. Three Danish ships of war, piloted by one James Vaden, an Englishman, likewise appeared on the fishery, with the object of exacting tribute from the English fishermen, on the score of a supposed title, on their part, to the right of the fishery. This absurd claim was answered by the English with their usual argument of Sir Hugh Willough-

* Purchas's Pilgrimes, vol. iii. p. 467.; and Churchill's Collection of Voyages and Travels, vol. i. p. 565.

† Anderson's History of Commerce, A. D. 1614; and Macpherson's Annals, vol. ii. p. 275.

by's prior discovery of Spitzbergen. An uncommon quantity of ice, with foggy weather, so pestered the fishers this season, that the English got entangled, and lay fourteen days beset. They returned home, as before, half laden; while the Dutch made a successful fishery *.

Captain Edge, in the Russia Company's service, had eight ships and two pinnaces under his command, in 1616. "This year," says Edge, in his account of the English and Dutch Discoveries to the North †, "it pleased God to bless their la-"bours, and they filled all their ships, and *left a* "*surplus behind, which they could not take in.*" They had 1200 or 1300 tons of oil by the 14th of August; and all the ships arrived in the Thames in September in safety. The Dutch had four ships in the country, which kept together in obscure places, and made an indifferent fishing.

Fourteen sail of ships, and two pinnaces, were equipped for the fishery, by the Russia Company, in the year following. They killed 150 whales; from whence they extracted 1800 or 1900 tons of oil, besides some blubber left behind, for want of casks; and all their ships returned without accident ‡.

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* Purchas, vol. iii. p. 467.; and Anderson's Commerce, A. D. 1615.

† Idem.

‡ Idem.

The superiority of the Dutch, in point of numbers, prevented open broils in Greenland, during two or three years; but the spirit of jealousy still existed, and again burst forth. Captain Edge, who had under his direction the whole of the Greenland fleet, went on board of a Dutch ship, which he met in the country, and showing him the King's commission, ordered the captain to depart, telling him to inform his comrades, that if he met any of them on the coast, he should take from them whatever fishing they had made. Edge treated the captain courteously and then allowed him to depart, on his promising to seek two of his companions and return home; in place of which, however, meeting with a Hull fisher, he was induced to return back and commence the fishing in Horn Sound. Edge, on hearing this, sent his *Vice-Admiral* to attack them, and take the produce of their fishing from them; but before he arrived, the Zealanders being aware of his approach, freighted two ships and sent them off, leaving one ship with some casks of blubber, and two whales and a half unflenched. The blubber was seized, together with the cannon and ammunition in the ship, to prevent reprisals on any of the English fleet, which the Zealander, being well armed, threatened. This blubber, however, proved a prize of little or no value to the English, as they had already procured more blubber and fins than

than their ships could carry *. The cannon and some other articles were restored to the owners on the arrival of the ships in England.

The Dutch, determined, in spite of the opposition received from the English, to pursue a commerce which promised such striking personal, as well as national, advantage, in 1617, procured a renewal of their charter for four years, whereby were incorporated two or three companies, formed in different States of the United Provinces. This charter interdicted any other persons in the country from participation in the trade, under the penalty of 6000 guilders for each ship, together with the confiscation of the vessel and cargo. From the substance of this charter, it appears, that the Dutch had, prior to this period, resorted to Jan Mayen Island, for the purpose of fishing for whales †.

With a view to make the whale-fishery trade more general, King James, who had then succeeded to the throne of England, in 1618, granted a patent, whereby he embodied a number of English, Scots and Zealand adventurers. This charter, however, appearing to militate against the privileges of the Russia and East India Companies, who had been at the greatest expence in the discovery and esta-

* Purchas, vol. iii. p. 467,–8.

† Beschryving der Walvisvangst, vol. i. p. 6.

blishment of the fishery, was annulled, notwithstanding that ships had been purchased, provisions contracted for, and other considerable preparations made by the different parties, for commencing the fishery. The Russia and East India Companies being therefore still allowed to monopolize the trade, with their joint stock, equipped thirteen ships and two pinnaces for the Greenland fishery.

But on this occasion the event proved most unfortunate; for the Zealanders, exasperated by the rescinding of the Scottish patent, the seizure of their oil, and other insults, appeared in the country with twenty-three well appointed ships. They placed themselves in the most frequented bays where the English fished, and setting on watch a great number of boats, prevented their success. Towards the end of July, ten sail being collected in the harbour at the Foreland, where lay two English ships and a pinnace, a division of five in number attacked them, killed a number of their men, shot away their sails, and overpowered them. They then plundered them of their cannon and ammunition, burnt their casks, and made prize of one of their ships for their indemnification. The rest of the English were dispersed, and most of them returned home empty as they were *.

* Purchas, vol. iii. p. 469.; Beschryving der Walvisvangst, vol. i. p. 26.

In this conflict, it appears that the English were either overpowered by numbers, or, being discouraged by the unexpected attack, did not fight with their accustomed coolness and valour. They fired short, according to the Dutch account, and were defeated, while the Dutch had the opportunity of satisfying our countrymen, as they observed, that they were as little deficient in personal courage as in diligence and zeal, to carry on their trade. These dissensions were viewed by the Governments of the two nations, with a happy degree of moderation, though it does not appear that they took any measures to prevent the recurrence of such events. On the arrival of the Dutch fleet with their prize in Holland, the States-General presented the English captain with a remuneration, and judiciously liberated his vessel *.

The occurrence of these mortifying circumstances, together with the arrival of the vessels of other powers on the fishing stations, which tended to divide the quarrel, had the effect of producing a conference between the captains of the rival nations, for the consideration of the best method of adjusting their differences, and preventing the liability to future disturbances. The English, at this time, claimed the exclusive right to the fishery, while the Dutch and the Danes asserted an equal title.

* Beschryving der Walvisvangst, vol. i. p. 26.

The English grounded their claim on the supposed discovery of Spitzbergen by Sir Hugh Willoughby, in the year 1553 *, and on the discovery and establishment of the fishery about which they contended. The Dutch denied, and with justice, Sir Hugh Willoughby's discovery, and rested their claim on the discovery of these islands by Heemskerke, Barentz and Ryp, in the year 1596. And the Danes, supposing Spitzbergen to form part of West Greenland, which was at an early period possessed by them, asserted this as a sufficient title.

Finding the determination of this point a matter of great difficulty, while it now appeared of less importance than they had at first conceived, having found that the whole coast abounded with fine bays and commodious harbours, each of which were equally resorted to by the whales, and equally well adapted for carrying on every operation relative to the fishery, they agreed at length to a division of these bays and harbours, which were to be considered as the independent possession of those to whom they were allotted.

The English had such influence as to obtain, not only the first choice, but the privilege of occupying

* This claim of the English was fully answered by D. Peter Planei, "*a very learned cosmographer*," who proved that Sir Hugh Willoughby never reached so far north as Spitzbergen. His protest against the claims and conduct of the English, is included in De Bry's "Historica Descriptio regionis Spitzber-" gæ," published in his Ind. Orient. tom. iii. p. 60.-62.

a greater number of bays or harbours than any of the rest. After the English, the Dutch, Danes, Hamburghers and Biscayans, each in succession, made a selection, in the order of their arrival on, or their supposed claim to the fishery.

The English chose for themselves some of the principal southern bays, most free from ice, consisting of Bell Sound, Preservation or Safe Harbour in Ice Sound, and Horizon Bay, the whole situated on the south of the Foreland; together with a small bay behind the northern part of the Foreland, which they called English Harbour, and another more remote which still bears the name of English or Magdalena Bay *.

The Hollanders, obliged to take up their quarters farther to the northward, chose the Island of Amsterdam, with two bays adjoining, one on each side; and a third, which they called Hollander's Bay, formed between the island and the main.

The Danes, who followed next after the Hollanders, contenting themselves with more circumscribed possessions, established themselves between the English and the Dutch. Their principal place of resort they called Danes Island and Danes Bay.

When the Hamburghers resorted to the fishery, they discovered a small bay to the northward of the Foreland, situated near the Seven Ice Bergs, which

* Histoire des Pêches, tom. i. p. 15.

being less encumbered with ice than many others, they took possession of for their fishing station, and named it after their native city.

Lastly, The Spaniards and French, though among the earliest visitors to Spitzbergen, found, on their arrival, in the year when the division was made, all the bays on the coast already disposed of and occupied; they therefore fixed themselves in an unclaimed situation, on the northern face of Spitzbergen.

Thus we perceive the origin of the names of the different places called English Bay and English Harbour, Hollanders Bay and Amsterdam Island, Danes Island and Danes Bay, Hamburghers Bay, Biscayners Point *, &c.

These arrangements having been adopted, the fishery was subsequently carried on with greater harmony. Each nation prosecuted the fishery exclusively in its own possession, or along the sea-coast, which was free for all. It was understood, however, that the ships of any nation might resort to any of the bays or harbours whatever, for the convenience of awaiting a favourable wind, taking refuge from a storm, or any other emergency; the prosecution of the fishery in the bays belonging to other nations, being alone prohibited. The better to secure the fulfilment of this part of the ar-

* Anderson's Commerce, A. D. 1618; also Beschryving der Walvisvangst, vol. i. p. 5, & 26.

rangement, it was agreed, that whenever a boat was lowered in a *strange* harbour, or happened to row into the same, the harpoon was always to be removed from its *rest*, so as not to be in readiness for use *.

All the early adventurers on the whale-fishery, both English and others, were obliged to be indebted to the Biscayans for their superintendence and help. The office of harpooner † requiring great experience as well as personal courage, was only suited to the Biscayans, who had long been inured to the dangers and difficulties attendant on the fishery of the fin-whale. The Biscayans were likewise looked to for coopers, "skilful in setting "up the staved cask." At this period, each ship carried two principals; the Commander, who was a native, was properly the navigator, as his chief charge consisted in conducting the ship to and from Greenland; the other, who was called by the Dutch *Specksynder*, or cutter of the fat, as his name implies, was a Biscayan, and had the unlimited controul of the people in the fishery; and indeed every operation belonging to it was entirely confided to him. When, however, the fishery

* Beschryving der Walvisvangst, vol. i.

† The *harpooner* is the person who strikes and kills the whale.

became better known, the commander likewise assumed the superintendence of the fishery. The office of *specksioneer*, as it is called by the English, was nevertheless continued, and remains to this day, though with a more limited prerogative. The specksioneer is now considered the principal harpooner, and has the "ordering of the fat," and extracting or boiling of the oil of the whale; but he serves entirely under the direction of the commander of the vessel.

It has been observed, that the merchants of Hull were among the most enterprising of the British subjects, in equipping ships for the whale and walrus fisheries of Spitzbergen and the adjacent islands; besides which, they distinguished themselves by the discovery, on the part of the English, of Jan Mayen Island, called by them Trinity Island, and by establishing a whale-fishery there at a very early period. The Russia Company wishing to monopolize the whole of this branch of commerce, disputed the right of the Hull merchants to participate in it; and wished to debar them from visiting even this secluded island. In consequence, however, of a proper representation of the facts, King James at this time (1618) privileged the corporation of Hull with a grant of the Jan Mayen Island whale-fishery*.

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* Anderson's History of Commerce, A. D. 1618.; Macpherson's Annals, vol. ii. p. 292.

Though the joint speculation of the Russia and East India Companies, in the Greenland whale-fishery in 1618, proved unsuccessful, they, nevertheless, made a second trial the following season, by equipping nine ships and two pinnaces; but a boat with ten men, belonging to one of the ships, being lost, one of the ships cast away, and five failing of success, so discouraged them, that they agreed to relinquish the trade.

After this determination, four members of the Russia Company compromised with the Society, and fitted out, on their own responsibility, seven ships in the year 1620; but on account of the number of Flemings and Danes in the northern harbours where they resorted to, they were induced to remove from station to station, and were disappointed of a full lading. Their united cargoes amounted to 700 tons of oil. In 1621, the same number of vessels being sent out, succeeded rather better, having procured 1100 tons of oil; the next season they had very bad success; and in the year 1623, the last of their union, they procured 1300 tons of oil. One of their largest ships was unfortunately lost this season, and twenty of the men perished*.

In the mean time, the Dutch pursued the whale-fishery with more vigour than the English, and with still better effect. It was no un-

* Purchas, vol. iii. p. 470.

common thing for them to procure such vast quantities of oil, that empty ships were required to take home the superabundant produce*. Such an importance, indeed, did they attach to this speculation, that the Dutch Companies always solicited, by petition, a renewal of their charter previous to its expiration; and of such value was it deemed in a national point of view, that for a number of years they were encouraged, by the fulfilment of their wishes. In 1622, in consequence of a petition to this effect, the charter of the Amsterdam Company was renewed for twelve years, and the charter of the Zealand Society was extended about the same time, whereby the latter were allowed to establish themselves in Jan Mayen Island, and to erect boiling-houses and cooperages in common with their associates †.

The Dutch having now incorporated a considerable and opulent company, and possessing the encouragement of the Prince of Orange's commission ‡, they were enabled to protect their own fishery, and to secure themselves against interruption from other nations. For which purpose, as appears

* Beschryving der Walvisvangst, vol. i. p. 28.; and Churchill's Collection of Voyages and Travels, vol. ii. p. 471.

† Beschryving der Walvisvangst, vol. i. p. 7,–10.

‡ Maurice de Nassau was Prince of Orange at this time.

from a subsequent charter*, they erected forts and dwelling-houses in different parts of their possessions.

The privileges of these companies, furnishing them with the opportunity of aggrandizement, to the exclusion of all other persons belonging to the United Provinces, produced a considerable degree of discontent, when the fishery, towards the expiration of these last charters, was in its most flourishing state. Hence, it became the general wish of those excluded from participation, that the trade might be entirely laid open. To effect which, therefore, towards the time of the expiration of the Amsterdam and Zealand charters, the merchants of some of the other provinces petitioned the government against their renewal. These petitions having failed, the Frieslanders, who, in particular, were wishful to embark in the whale-fishery trade, made a representation to the States-General of Friesland to this effect. In consequence of which, inquiries, agreeable to their suggestions, began to be made respecting the legality of benefiting any part of the community of a republican country, to the exclusion of the rest. The result placed the legality of

* The whole of these charters I have by me, in the English and French, as well as in the original languages. I find them, however, like most law documents, so redundant, and, on the whole, so uninteresting, that I shall not encumber my pages with the translation.

the proceeding in a light so equivocal, at the same time that the claim of the memorialists relative to their right to participate in the fishery, was so equitable, and their arguments of the unbounded and natural freedom of the seas, so appropriate, that the States-General of Friesland were induced to grant a charter to a company formed in that province, which endowed them for twenty years with similar privileges, as those of the other companies of Holland*.

When, on the strength of this charter, the Frieslanders, in the year 1634, had prepared three ships for the fishery, to prevent disturbance, and to secure themselves against future litigation, they perceived a necessity for procuring the sanction of the Zealand and Amsterdam Companies, to their right to participation. The States-General of Holland having, at their request, given a verbal acknowledgment to their charter, the two ancient companies gave instructions to the commanders of their ships to respect it also. To prevent also, as far as practicable, the possibility of unpleasant consequences, arising from the inter-

* This period of time, it seems, was reduced to eight years, on the union of the Frieslanders with the other fishing companies of Holland; so that the freedom of the fishery, for every one, was declared at their expiration in 1641,–2. Beschryving der Walvisvangst, vol. i. p. 10,–12.

ference of the Frieslanders' ships with those of the other companies, in the course of the year, they contracted together and formed a triple union. The principal conditions of this union were, that the Company of Friesland, for the use of their vessels in the concern, should be entitled to all the privileges of the ancient companies, with the use of all their bays and harbours; and that they should receive one-ninth of the produce of all the ships of the united companies as their share, out of which they were to allow the Amsterdam Company 10 *per cent.*, probably in consequence of these being the original adventurers; that the influence of each company in matters of dispute, should be in the proportion of six votes to Holland, two to Zealand, and one to Friesland; and that in case of any new discovery being made, the discoverer should be entitled to all emoluments to be derived therefrom for five years, and then it should revert to the use of the general concern*. The whole of the articles of union amounted to twenty-four, but the preceding are the most important. Though it appears, that the interests of the three companies were united in 1634, the formal contract was not completed and signed until the 23d of June 1636. The Holland

* Beschryving der Walvisvangst, vol. i. p. 13,–15.

Idem, vol. i. p. 18.–20, contains the charter whereby the Zealanders, Hollanders, and Frieslanders were incorporated.

and Zealand Companies were the more willing to incorporate the Frieslanders along with them, from the hope, that this union would effectually prevent any other towns from joining in the trade. In this, however, they were disappointed; for, at the solicitation of different persons, it was found necessary to allow all who were in readiness within a certain limited time, to unite themselves with the concern. For the use of these additional adventurers, the ancient companies appropriated a part of their possession, lying in the South Bay on the Main, where the Haarlingers erected their boiling-house*.

While the Dutch followed the whale-fishery with perseverance and profit, they were successfully imitated by the Hamburghers and other fishermen of the Elbe, but the English made only occasional voyages. Sometimes the Russia Company sent out ships, at others, private individuals belonging to London, but more frequently the merchants of Hull embarked their property in the Spitzbergen trade.

About this period, when the fishery was chiefly pursued in the very bays where the ships lay at their moorings, it was found a matter of convenience and dispatch, to erect various buildings for the accommodation of the coopers employed in making and repairing casks, and for the seamen who were engaged in re-

* Beschryving der Walvisvangst, vol. i. p. 17.

ducing the blubber into oil, together with suitable erections for performing this operation. The erections of the Dutch were the most considerable; but even the English, though their shipping in the trade had never been very numerous, had, we learn, several substantial buildings on the margin of Rynier's River in Bell Sound; among which, were a a cooperage firmly built of timber, and roofed with Flemish tiles, 80 feet in length and about 50 in breadth; a considerable boilers' lodging-house; and boiling furnaces with chimneys of brick*.

The adventurers in the whale-fishery, conceiving that considerable advantages might be derived, could Spitzbergen be resorted to as a permanent residence, were desirous of ascertaining the possibility of the human species subsisting throughout the winter in this inhospitable climate. The English merchants, it appears, offered considerable rewards, together with the supply of every requisite for such an undertaking, to any person who would volunteer to pass the winter on any part of Spitzbergen; but not one was found sufficiently hardy to undertake the hazardous experiment. Such, indeed, was the

* These buildings were erected originally by the "Flemings, in the time of their trading hither," as appears from Pelham's "Miraculous Preservation and Deliverance of Eight Englishmen, left by mischance in Greenland 1630," published in Churchill's Collection, vol. iv. p. 750.; and a verbatim copy in "Clarke's Naufragia," vol. ii. p. 163,–206.

terror with which the enterprise was viewed, that certain criminals preferred to sacrifice their lives to the laws, rather than pass a year in Spitzbergen. The Russia Company, it is said, procured the reprieve of some culprits who were convicted of capital offences, to whom they not only promised pardon, but likewise a pecuniary remuneration, on the condition that they would remain during a single year in Spitzbergen. The fear of immediate death induced them to comply; but when they were carried out and shown the desolate, frozen, and frightful country they were to inhabit, they shrunk back with horror, and solicited to be returned home to suffer death, in preference to encountering such appalling dangers. To this request, the captain who had them in charge humanely complied; and on their return to England, the company interceded on their behalf and procured their pardon *.

Probably it was about the same time, that nine men, who were by accident separated from one of the London fishing ships, were left behind in Spitzbergen: all of them perished in the course of the winter, and their bodies were found on the ensuing summer, shockingly mangled by beasts of prey. The same master who abandoned these poor wretches to so miserable a fate, was obliged, by the drifting

* Pelham's Narrative.

of the ice towards the shore, to leave eight of his crew who were engaged in hunting rein-deer for provision for the passage home, in the year 1630. These men, like the former, were abandoned to their fate; for, on their proceeding to the usual places of resort and rendezvous, they perceived with horror, that their own, together with all the other fishing ships, had departed. By means of the provisions procured by hunting, the fritters of the whale left in boiling the blubber, and the accidental supplies of bears, foxes, seals and sea-horses, together with a judicious application of the buildings which were erected in Bell Sound, where they took up their abode, they were enabled not only to support life, but even to maintain their health little impaired, until the arrival of the fleet the following year *.

The preservation of these men, revived in the Dutch the desire of establishing permanent colonies, and confirmed them in the idea of the possibility of effecting this desideratum. It was, however, necessary that other trials should be made, before the project could be carried into execution.

In consequence, therefore, of certain encouragements proclaimed in general throughout the fleet, seven men volunteered their services, were landed

* Pelham's Narrative in Churchill's Collection, vol. iv. and Clarke's Naufragia, vol. ii. p. 179.

at Amsterdam Island *, furnished with the needful articles of provisions, clothing, spirits, fuel, &c., and were left by the fleet on the 30th of August 1633 †. About the same time, another party, likewise consisting of seven volunteers, were landed in Jan Mayen Island, and left by their comrades, to endure the like painful service with the former. On the return of the fleet in the succeeding year, this last party were all found dead ‡, from the effects of the scurvy; but the other which was left in Spitzbergen, nine degrees further towards the north, though they suffered exceedingly from their privations and unusual hardships, all survived §. Encouraged by this partial success, for it appears that the melancholy result of the experiment at Jan Mayen was as yet unknown to the Spitzbergen fishermen, it was proposed that another party should repeat the experiment in the ensuing winter. Accordingly, other seven volunteers were landed as before, supplied with every supposed necessary, and quitted by their comrades, on the 11th of September 1634. Before the close of the month of November, the scurvy made its appear-

* Amsterdam Island lies on the N. W. of Spitzbergen, in lat. 77° 44′ N. long. 9° 51′ E.

† Churchill's Collection, vol. ii. p. 413.

‡ Idem, vol. ii. 415,–425.

§ Beschryving der Walvisvangst, vol. ii. p. 26,–31.

ance among these devoted people, and by the beginning of March, had, by its dreadful ravages, destroyed the whole party *. The names of each of the fourteen men who suffered in the two trials, are perpetuated; but of the names of those who successfully encountered the severities of the arctic winter, I have not met with any notice. Neither does it appear what were the encouragements which stimulated those hardy adventurers to undertake the hazardous enterprise, though it is very evident the inducements must have been considerable.

In the year 1635, the Russia Company was endowed by Charles the First, with the exclusive right of importing the oil and fins of whales. This indulgence was merely a confirmation of the proclamation of the 17th of James the First, with the restriction, that the fishery should be prosecuted by this company in its joint stock capacity only †.

The bold and unconscious manner in which the whales resorted to the bays and sea-coasts at this period, their easy and expeditious destruction, the consequent regularly productive state of the fishery, together with the immense herds in which the whales appeared, in comparison of the number

* Churchill, vol. ii. 427,-8.; and Anderson's Commerce, A. D. 1634; also, Beschryving der Walvisvangst, vol. ii. p. 31.

† Anderson's Commerce, A. D. 1635.

which was killed,—encouraged the hope that the profitable nature of the fishery would continue unabated. This consideration induced the enterprising Dutch to incur very great expences in making secure, ample and permanent erections, which they gradually extended in such a degree, that at length they assumed the form of a respectable village, to which, in reference to the use that it was designed for, they gave the name of *Smeerenberg* *.

The result did not, however, justify the sanguine expectations of the Greenland Companies; for the fishery, as it soon appeared, had already attained its acme †, and began to decline so rapidly from the year 1636–7, to the termination of the companies charters, that their losses are stated, on some occasions, as having exceeded their former profits ‡. To the system of extravagance which they had adopted, with the vast expence which they incurred in the the construction of buildings, in a region where most of the materials had to be imported, is attributed the subsequent failure of the Dutch chartered companies.

Towards the expiration of the charters of the united Dutch Greenland Companies in the year 1642,

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* Beschryving der Walvisvangst, vol. i. p. 27,–28. The word Smeerenberg is probably derived from the Dutch words *smeer*, signifying *fat*, and *bergen*, to put up.

† Forster's Discoveries in the North, p. 426.

‡ Beschryving der Walvisvangst, vol. i. p. 29.

their renewal was attempted by the interested parties; but in consequence of the people of Overyssel, Utrecht, Guelderland and others, having, by their representatives, most strenuously resisted the measure, and petitioned for liberty to embark in the whale-fishery trade; their High Mightinesses the States-General conceived that the renewal of the charters would not only give general dissatisfaction, but would likewise be inimical to the commercial interests of the United Provinces, and therefore caused the trade to be laid entirely open to all adventurers*. This determination produced an effect so happy, that in a short time the trade was increased almost ten-fold. The number of ships annually sent out by the chartered companies, would appear to have only amounted to about thirty, while, on the dissolution of the monopoly, the influx of shipping into the whale-fishery commerce was so great, that in a few years they accumulated to between two and three hundred sail †.

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* Beschryving, vol. i. p. 21.

† De Witt, in his "Interest of Holland," mentions that the Greenland Whale-fishing trade increased ten-fold, on the dissolution of the monopolizing companies. Now, as the Frieslanders, who fitted three ships, were considered as forming one-ninth part of the united companies, the fleet of the whole would probably amount to about twenty-seven sail, to which, adding the Haarlingers, and other additional adventurers, we may consider the Dutch Greenland Fishery, during the latter

Prior to the time when the trade was laid open, the Jan Mayen whale-fishery, like that of Spitzbergen, had attained its maximum *. The fishermen, by much experience, having become very dexterous in their profession, while the whales, yet unwary, assembled around this barren island in vast profusion, produced such a prodigious destruction among them, that it is confidently affirmed, that one of the northern company's ships, commanded by a William Ys, made two voyages, and took home two complete cargoes, of 1000 barrels of oil each, in one year †. After this time, however, the fishery at Jan Mayen began to fall into decay. The whales, incessantly annoyed, withdrew to re-

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years of the monopoly, as employing at least thirty vessels. If De Witt be correct, therefore, a ten-fold increase will make the fleet in subsequent years to have increased to three hundred sail. And, as these ships were *double manned*, they must have carried about sixty men each, which, multiplied by 300, the number of vessels employed, gives the total of their crews, 18,000 men! Lieven Van Aitzina, quoted by De Witt, indeed says, That the Dutch Whale-fishery employed upwards of 12,000 men, at the same time that the English did not send a single ship, which was about the period referred to. It is therefore probable, that the above estimate may not be very wide of the truth. See Macpherson, vol. ii. p. 290.; and Beschryving der Walvisvangst, vol. i. p. 28.

* Forster's Northern Discoveries, p. 422.

† Beschryving, vol. i. p. 28.

gions farther to the north, and even took shelter among the ice. This island, in consequence, fell rapidly into disuse, until it was at length, for the purpose of whale-fishing at least, abandoned altogether.

The Dutch being at war with England in 1653, and having neither men nor ships of war to spare for the protection of their whale-fishery, this lucrative branch of commerce was obliged, for the season, to be suspended. In the war of 1659,* as well as in that of 1665 and two following years, the fishery was also conditionally prohibited. As at such times their unemployed fishing *officers* might be induced to engage in the service of foreign nations, and thus carry the trade abroad to the disparagement of their own country, a proclamation was issued, prohibiting, under severe penalties, all commanders, harpooners, boat-steerers, &c. from embarking in the whale-fishery trade in the ships of any other nation during the war; the exportation of fishing utensils was also prohibited and carefully guarded against; and such ships as were occasionally allowed to proceed to the fishery, under adequate protection, were prevented from landing their cargoes in any foreign country, under the penalty of 6000 guilders for each ship, security for which was demanded from the owners, before they were allowed to put to sea.

* Beschryving, vol. i. p. 21.

The Dutch whale-fishery continued to flourish for many years after the trade was laid open. Between the years 1660 and 1670, four or five hundred sail of Dutch and Hamburgh ships were yearly visitants to the coast of Spitzbergen, while the English sometimes did not send a single ship*, The trade, after this, began gradually to decline. The whales, which were so constantly and vigorously pursued, in a great measure left the bays, receded to the sea, and eventually to the ice. The fishery, in consequence, became more precarious. Hitherto it had been so regularly successful, as to amount almost to a certainty, but now it proved occasionally unsuccessful. Not only so, but the danger resulting from the ice, which the fishers were now obliged to encounter, was the occasion of frequent losses among their shipping. Notwithstanding this alteration in the trade for the worse, it only declined in a comparative point of view; for in consequence of the adoption of a system of frugality and retrenchment, they were yet enabled, on the whole, to realize very handsome profits.

The magnitude of the Holland and Hamburgh fishing concerns, could not fail to attract the attention of surrounding nations. The British Government

* In 1669, the English sent but one ship to the Greenland Whale-fishing, and none in the year before.—Macpherson's Annals of Commerce, vol. ii. p. 544.

saw with regret, such a profitable and valuable speculation entirely laid aside. They saw its importance as a nursery for hardy seamen, as offering employment for a great number of ships, while the requisite equipments would require the co-operation of a number of artisans, tradesmen and labourers; and, above all, they saw its importance in a national point of view, where valuable cargoes might be procured without *first cost*, excepting the expences of the voyage, while, on the contrary, great sums of money were annually sent out of the country and paid to foreign nations, for the purchase of those very articles which might be had out of the sea. To encourage, therefore, the renewal of the whale-fishery trade, an act of Parliament was passed in 1672*, whereby the rigours of the navigation act were dispensed with, and its essential properties so modified for the ten following years, that a vessel for the whale-fishery, being British built, and having a master and one-half of the crew British subjects, might carry natives of Holland or other expert fishers, to the amount of the other half. As a further encouragement, the oil and whalebone imported were exempted from all duties, though the colonies were to pay 6s. *per* ton for oil, and 50s. *per* ton for such whalebone as should be imported in their own shipping, and half that duty, if taken thither by Eng-

* 25th Char. II. c. 7.

lish shipping. But the oil imported by foreign ships, was to be charged with 9*l.* Sterling *per* ton, and the whalebone with 18*l. per* ton of duty. In consequence of this encouragement, some few private attempts were made to revive the trade; but they, it seems, were attended with such indifferent success, that in seven years the trade was again entirely discontinued *.

From 1672 to 1674, as likewise in the year 1691, the Dutch whale-fishery was suspended, in consequence of war †.

The act for the encouragement of the English whale-fishery at Spitzbergen, was continued in 1690 for four years longer ‡; but as this did not effect the equipment of a single ship, the plan of a joint-stock company was again resorted to, as promising the most probable prospect of the renewal of the trade, and its prosecution with vigour and success. Accordingly, in the year 1693, Sir William Scaven, and forty-one persons more, having subscribed a joint capital of 40,000*l.* were incorporated by act of Parliament § for a term of fourteen years, un-

* Anderson's Commerce, A. D. 1672.

† Beschryving, vol. i. p. 21.

‡ 2d William and Mary, c. 4.

§ Idem, act 4th & 5th c. 17.

der the name of "The Company of Merchants of "London Trading to Greenland." The privileges of this corporation principally consisted in an extension of the indulgences granted by 25th Car. II. c. 7., among which, the permission to engage two-thirds of the crew of each fishing ship from foreign countries, in consequence of the great scarcity of English harpooners and other fishing officers, was a prominent article.

The shipping interests of Holland having now become most extensively engaged in the whale-fishery, occasional accidents from the ice and other casualties among such a number of vessels, were unavoidable. It became, therefore, an object of importance to those concerned, to establish some laws for the disposal of the property saved from wrecks. Hence, a code of laws, which had been originally drawn up by the Greenland adventurers in 1677, was, in the year 1695, sanctioned and confirmed by the States-General *.

The London Greenland Company thinking their original capital of 40,000*l.* too inconsiderable to fulfil their extensive designs, in the interval between the time of their incorporation and the year 1703, increased their subscriptions

* Beschryving der Walvisvangst, vol. i. p. 22,-24.

to 82,000*l**. In the mean time, the Parliament exempted all their importations from every custom, duty, or imposition whatever†. Notwithstanding, this company, from their great capital, the indulgence of engaging so many foreign seamen skilled in the fishery, and other privileges, had every apparent chance of pursuing the trade with the best effect, especially when it is known, that at this period the whales were yet occasionally met with in great plenty; yet, from various losses, combined probably with unskilful management, they were so unfortunate, that some time before the conclusion of their term, their whole capital of 82,000*l*. was expended‡. This amazing loss, together with former failures, so intimidated other persons from embarking in so hazardous a speculation, that even the extension of all the privileges of the chartered company, together with a free trade to all adventurers §, were not sufficient, for a length of time, to encourage the

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* Anderson's History of Commerce, A. D. 1696. Elking, in his View of the Greenland Trade, 2d edit., *Introduction*, implies, that 45,000 *l*. of this subscription only was paid.

† 7th & 8th Gul. III. c. 33.

‡ Anderson's History of Commerce, A. D. 1696.

§ 1st Anne, c. 16. § 1.

subjects of Great Britain to make any vigorous attempt to renew the fishery.

The failure of the latter Greenland Company appears the more surprising, when we are informed, that in the early part of their term, namely, in the year 1697, the foreign whale-fishery was universally successful. The superintendent of the Dutch fishery at this time remarks, that when lying in one of the bays with his ship, the Four Brothers, having a cargo of seven fish on board, a richly laden fleet assembled at that place, comprising 121 Hollanders, whose cargoes consisted of 1252 whales; 54 Hamburghers with 515 whales, 15 Bremeners with 119 whales, and 2 Embdeners with 2 whales: in all which fleet, there was not one *clean** ship. The least number of fish taken by any one of the Dutch ships was three, and many had procured full cargoes. This entire squadron, therefore, comprising a fleet of 192 ships, carried home the produce of 1888 whales †.

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* The term *clean* is applied to those ships which have met with no success in the whale-fishery.

† Beschryving der Walvisvangst, vol. i. p. 5.—I find various accounts of the success of the fishery of this year; the differences in which, are probably occasioned by including the ships of certain ports and states among those of other nations, or excluding some of those which properly belonged to them. According to the "Histoire des Pêches," the number of ships

Elking, in his "View of the Greenland Trade "and Whale-Fishery," attributes the singular failure of the London Greenland Company, to causes which have been generally overlooked. They are the following:

1. Their ships were commanded by persons unacquainted with the business, who interfered in the fishery; whereas, "the chief harpooner *ought to* "*have commanded*" at this time.

2. Their captains had fixed pay; whereas they should have been paid in proportion to their success in the fishery. Hence they had no encouragement to pursue the fishery among the ice, but frequently retired to some harbour in Spitzbergen, and amused themselves with hunting deer; the tal-

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assembled in the Bay alluded to, was 188; the number of fish taken by the Bremeners, was 190; and the number of fish which the whole fleet had on board, amounted to 1959. This corresponds more nearly with another account, now before me, which runs as follows:

The cargoes of 121	Dutch vessels produced	41,344 puncheons of oil.
47	Hamburgh, -	16,414
12	Bremen, -	3,790
4	Danish, -	1,710
2	Swedish, -	540
2	Embden, -	68
The total cargoes of 188	ships, consisting of 1968 whales, produced	63,866 puncheons of oil!

According to Zorgdrager, the Dutch shipping employed in the whale-fishery this season consisted of 111 sail, which captured 1274½ fish.

low, hides and horns of which were allowed them as a perquisite, and left their boats to seek whales where few, if any, were to be found.

3. The blubber they happened to take home, was slovenly and wastefully managed in boiling, and the fins were ill cleaned: hence, when their goods were offered for sale, they fetched only an inferior price.

4. Their lines and fishing instruments were injured or spoiled, for want of care, and many articles embezzled; whereby the company was repeatedly put to the expence of renewing them.

5. They fitted their ships extravagantly; paid an exorbitant price for their boats and fishing apparatus; and paid great sums for incidentals, much of which might have been saved.

6. The last ship they sent out was unfortunately wrecked in the ice, after a successful fishery, having taken eleven whales;—a misfortune which accelerated the ruin, and increased the mortification of the company, insomuch that they were discouraged from persevering any longer*.

The direct importation of Greenland produce into England being inconsiderable, its importation from Holland, or other foreign states, was permitted; whalebone, however, was required to be brought into the country in fins only, and not cut, or in

* Elking's View, &c. p. 46.

any way manufactured; nor could it be landed before the duty chargeable thereon was secured or paid, under penalty of the forfeiture of the goods, and double their value *. And, by a subsequent statute, other penalties were declared against persons having foreign cut-whalebone in their possession, or masters of ships importing the same †.

From the year 1715, to 1721, one year with another, 150 tons of whalebone were imported yearly into London only; even when the price was 400*l.* *per* ton. The whalebone which was at the same time imported into other ports of Great Britain and Ireland, may, at a moderate estimation, be supposed to be 100 tons more; the value of which, 100,000 *l.*, was annually paid to foreigners for whalebone, at this period ‡.

It was not, it appears, until the whale-fishery was on the decline at Spitzbergen, that the Davis' Straits fishery was resorted to. The Dutch sent their first ships thither in the year 1719.

The shipping employed in the Greenland and Davis' Straits whale-fisheries, in the year 1721, from a list published in London at the time, with

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* 9th & 10th Will. III. c. 23. § 12. & c. 45.

† 4th Anne, c. 12. § 6.

‡ Elking's View, &c. page 65.

the object probably, of stimulating the British subjects by the example of foreign nations, appears to have amounted to 355 sail: 251 of these ships were fitted out from different ports in Holland; 55 from Hamburgh; 24 from Bremen; 20 from the ports in the Bay of Biscay; and 5 from Bremen in Norway *.

At this time, an attempt was made by a company of merchants, belonging to Bergen, to establish a trade with the Esquimaux, in Davis' Straits, when they likewise made a feeble effort to carry on a whale-fishery in that quarter. For this latter purpose, one ship was dispatched, which, meeting with a severe storm near Statenhook, where there is a dangerous current, was dismasted, and nearly upset. Notwithstanding her crippled state, she arrived at Bergen in safety. Two years afterwards (1723), the same company sent out another ship to Davis' Straits, which, after wintering there, returned home the following summer, with 120 barrels of blubber, procured from one whale, which, with the whale-bone, sold for about 540 *l.* On another occasion, this company's fishing ship returned home clean, when, at the same time, their trading vessel procuring a bad freight, they relinquished both these speculations †.

* Anderson's Commerce, A. D. 1721.

† Crantz' Greenland, vol. i. p. 304.

When, by the lapse of some years, the unfavourable impression produced on the minds of speculative persons, by the immense losses suffered by English adventurers in the whale-fishery, had partly worn off, the propriety of attempting this trade became a subject of conversation among the Directors of the well known South Sea Company.

This subject was introduced, it appears, by Henry Elking, a person who had had long experience in the trade *; who suggested it as a most desirable speculation to the then sub-governor of the South Sea Company, Sir John Eyles; and so impressed him with the opinion of its practicability, that he proposed it to the company in January 1721 †. The proposition was received and discussed with considerable warmth; and though it was at length carried, some members, "without whose concurrence it was impossible to proceed ‡," again expressed their doubts, and withheld their complete sanction. In consequence of this, Sir John Eyles addressed a letter to Mr Elking, requesting him to lay before the Court of Directors, in writing, the arguments and principles upon which he considered that this company might succeed in the fishery, when so many persons before them had totally failed. Elking, therefore, drew up his tract, entitled, "A View of the Greenland Trade and Whale-fishe-

* Elking, p. 19. † Idem, p. 12. ‡ Idem, p. 13.

"ry, with the National and Private Advantages "thereof*;" wherein he attempted to show "How "the Whale-fishery is, and ought to be perform-"ed;"—"by whom it is chiefly carried on," "and how much to their advantage;"—"A brief "View of the Early Fishery; and what have been "the Causes that all the attempts of the English "to retrieve it, were unsuccessful;"—"and a full "proof that England may retrieve the Trade, and "are able to carry it on to greater advantage than "any other Nation;"—"and all the known Objec-"tions to the contrary, answered and removed †." His reasoning on this subject proved eventually so satisfactory, that, after various re-considerations, and the loss of much time, their debates closed, at one of the general courts of the company, held in 1724, with the adoption of a resolution, that the whale-fishery should be attempted ‡.

The British Legislature held out encouragements to this company, similar to those offered to former adventurers. By act of Parliament, all the produce of the Greenland Seas was exempted from the existing duties during seven years, from Christmas 1724, on the condition of its being imported in British ships; the commander, and at least one-

* London, 1722, 12mo, 2d edit. published in 1725.

† Idem, p. 30.

‡ Anderson's Commerce, A. D. 1724.

third of each ship's company, being British subjects *. Two years afterwards, by another act of Parliament, the same privileges were extended to speculators in the Davis' Straits Whale-fishery, which fishery, had, since the year 1719, been carried on by the Dutch, with such success as to encourage its continuation, and induce about one-third part of their shipping employed in the whale-fishery to resort thither †. This act expressly included the exemption, not only of the produce of the whale from all custom whatever, but likewise the fat, skins, and tusks of the seal, bear, walrus, or any other fish or creature caught in the Seas of Greenland or Davis' Straits ‡.

The South Sea Company not being able to commence the whale-fishery the same year in which they had adopted the resolution to that effect, caused a fleet of twelve new ships of about 306 tons burden each, to be built in the River Thames for the purpose, equipped each vessel with the necessary supplies of cordage, casks, and fishing instruments, and engaged for their use the Duke of Bedford's wet-dock at Deptford, where boiling houses and other conveniences were constructed §. In the en-

* 10th Geo. I. c. 62.

† Reste's Histoire des Pêches, tom. iii. p. 208, &c.

‡ 12th Geo. I. c. 26.

§ Anderson's Commerce, A. D. 1724.

suing spring (1725), the fleet being all in readiness, put to sea, and returned safe with 25½ whales. The proceeds of this voyage, though so moderate as scarcely to be sufficient to pay the expences of wages, provisions, and interest of the capital engaged, were yet superior to those of any succeeding year, during the period in which the company pursued the trade *. This cargo would have made a saving voyage, and even have afforded a tolerable profit, if procured by the same number of Dutch ships; but owing to the extraordinary expences to which the English were subjected, they carried on the trade with much less chance of success than any of their contemporaries. One additional expence, and that a very prominent one, was occasioned by their being obliged to procure their fishing officers from foreign ports, the English at this time being entirely unacquainted with the trade. Excepting, therefore, a few natives of Scotland, who were induced to leave the service of the Dutch, on the commencement of the South Sea Company's fishery, and engage in their employ, the whole of their harpooners, boat-steerers and line-managers, were procured from Fohrde in Holstein. These men, from their superior pay as officers, and the expences of their passages, which the company were obliged to bear, regularly cost them about 20*l.* each man.

* Anderson's Commerce, A. D. 1725.

Thus, 152 foreigners employed in the first voyage, cost 3056*l.* 18*s.* 3*d.*, while above twice their number of British subjects cost only 3151*l.* 15*s.* 5*d.* *

In the year 1730, the company's ships were increased to twenty-two sail. The combined cargoes of this fleet consisted only of twelve fish, and their year's loss, in consequence, besides wear and tear, was 8921*l.* 5*s.* 9*d.* †

The next year the same fleet was sent out, whereof one of the ships was lost, the remaining twenty-one sail captured but fourteen whales; consequently this voyage was little better than the one preceding ‡.

The company's ships were at this time provided with a new invented gun for shooting a harpoon, which enabled the possessor to strike the whale at a much greater distance than he could possibly effect by hand. This instrument was productive of little advantage. It was with great difficulty that the Dutch harpooners could be induced to make use of it; these men, like the older fishers of the present day, having a particular aversion to adopt any new plan, however excellent, conceiving the method which experience had established, to be the most effectual for ensuring success; so that, with

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* Anderson's Commerce, A. D. 1725.

† Idem, A. D. 1730. ‡ Idem, A. D. 1731.

these people, the introduction of any new system was ever deemed an innovation, while the mere circumstance of any plan or contrivance being out of the ancient practice or form, was generally of itself sufficient to prevent its adoption. In a ship, however, fitted out by Messrs Elias Bird and Company, about the year 1733, the prejudices of the harpooners * were so far overcome, that the harpoon-gun was the means of taking two of the fish out of three, which constituted the vessel's cargo †.

The South Sea Company having persevered in the whale-fishery with indifferent or bad success for eight successive years, whereby they sunk a vast sum of money, being hopeless of redeeming their losses, abandoned the whale-fishery after the season of 1732. A short time before this, they had solicited Government for a bounty to assist them in the speculation, and enable them to continue it. This request was subsequently complied with, but

* As this occurred eight or nine years after the revival of the whale-fishery by the South Sea Company, it is very possible, that Bird's ship was furnished with some English harpooners, who had been bred in the service of the company. These men were not likely to be so strongly prejudiced against new inventions as the Dutch were; consequently, the harpoon-gun would, in their hands, meet a fair trial, and its importance be duly appreciated.

† Anderson, A. D. 1731.

not until they had determined to abandon the trade. The bounty first offered to adventurers, consisted in an annual award of 20s. *per* ton on the burden or tonnage of all British whale-fishing ships of 200 tons and upwards *. Two ships sent out by private individuals, alone enjoyed the benefit of this bounty; but yet it appears without deriving any advantage from the voyage.

The Bergen Greenland Company, at this time again resolved to renew the Davis' Straits trade †; but whether it was confined to the traffic with the Esquimaux, or it likewise extended to the whale-fishery, does not appear; at any rate, this trial, like their former, seems to have been so imbecile, as to merit but little of our curiosity as to the event.

In 1736, a London ship, which visited the whale-fishery, procured a cargo of seven fish ‡; a degree of success which was fortunately different from that of most of the antecedent English whalers. At the same time, 191 Dutch ships captured 857½ whales. A successful attempt was also made in the whale-fishery the following year from Ireland, a number of fish having been killed in the neighbouring sea, sufficient to supply several counties with oil and bone §.

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* 6th Geo. II. c. 33.

† Hist. des Pêches, tom. iii.

‡ Anderson, A. D. 1736.

§ Gent. Mag. vol. vii. p. 703.

Five English Greenland ships in 1739, fitted out by private gentlemen, obtained $11\frac{1}{2}$ whales *.

The encouragement of duty-free imports, and a bounty of 20s. *per* ton on the whole tonnage of the vessels employed in the northern whale-fisheries, not being found sufficient to induce any extensive embarkation in the trade, the act of Parliament entitling adventurers to these privileges was extended in the year 1740 to the 25th of December 1750, with the addition of 10s. more *per* ton as bounty, and the protection of fishing officers from being impressed into his Majesty's service. These additional encouragements were stipulated to continue only during the war with Spain.

A heavy storm occurred on the coast of Spitzbergen, in the month of May 1746, in which thirty Dutch vessels and three English were wrecked, and several others sustained material damage †.

The importance of the whale-fisheries in a national view, became more and more evident to the British Legislature, who, therefore, to encourage still more its prosecution, enacted, in 1749, that the original bounty of 20s. should be increased to 40s. *per* ton. By this act, ships of not more than two years old, built in the British colonies in America,

* Gent. Mag. vol. ix. p. 495.

† Idem, vol. xvi. p. 328.

were, under certain stipulations, entitled to the same bounty as British built ships, provided they sailed before the 1st of May from America, and continued fishing until the 20th of August, unless they had procured a certain quantity of blubber, and provided also they returned from the fishery to some port in Great Britain. Foreign Protestants also, who had served three years on board of any British whale-fishermen, and had fulfilled the regular forms of naturalization, were, during their residence in England, by this act, endowed with the same privileges in the whale-fisheries, as the natives of Britain themselves *.

This season the fishery in Davis' Straits was uncommonly prosperous. Forty-one Dutch ships took 205 whales, making 8704 casks of blubber; four Hamburgh vessels took $25\frac{1}{2}$ whales, and some others were likewise successful †.

About this period the Hudson's Bay Company were in the habit of importing into England a trifling quantity of the produce of the whale, from their establishment in Hudson's Bay ‡.

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* 22d Geo. II. c. 45.

† Gent. Mag. vol. xix. p. 427.

‡ Robson, in his "Account of a Six Years residence in Hudson's Bay," p. 65., mentions these imports, and states, that the price of whale oil in the year 1742, was 18*l.* 13*s.* *per* ton; in 1743, 14*l.* 8*s.*; and in 1744, 10*l.* 1*s.* *per* ton.

The effect of the bounty of 40s. *per* ton, together with the other inducements held out to speculators in the whale-fishery, was such, that immediately after the passing of this last act of Parliament, the British whale-fishery began to assume a respectable and hopeful appearance. The merchants of Scotland began to participate with the English, in the year 1750.

The combined fleets of England and Scotland, in the year 1752, amounted to forty sail; in 1753 they were increased to forty-nine sail; in 1754 to sixty-seven sail *; in 1755 to eighty-two sail, and the year following to eighty-three sail, which was the greatest number of ships employed in the trade for the twenty years following, while the least number amounted to forty sail during the same period.

The British whale-fishery being now pretty firmly established, the Legislature wisely directed its attention to the method of effecting, by this commerce, the most important national advantages; hence, at the same time that it encouraged the adventurers in the trade by bounties, it took the opportunity of occasional enactments to introduce various new regulations, as well as limitations to the

* The number of ships on the fishery this year (1754), from different nations, was 227; viz. 67 British; 132 Dutch; 17 Hamburghers; 6 Danes; 2 Bremeners; 2 French; and 1 Embdener.—Scots Magazine, 1754.

original acts, in which the perpetuity of the trade, and the economical application of the bounties were generally prominent objects. Thus, in the year 1755, an act of Parliament for continuing, explaining, and amending the several previous acts for the encouragement of the northern whale-fisheries, contained the following additions.

"That every ship employed in that fishery, shall have on board an apprentice, indentured for three years at least, for every fifty tons burthen, who shall be accounted as one of the number of men who, by law, ought to be on board such ship.

"That no ship employed in the fishery, above the burthen of 400 tons, after the 25th of December 1757, shall be entitled to a larger bounty than a ship of 400 tons would be entitled to. And,

"That ships under 200 tons burthen, shall hereafter be entitled to the bounty of 40s. *per* ton, the same as those of 200 tons and upwards, are entitled to it by former statutes*."

Parliament, the same session, empowered the Treasury to pay the bounty to the owners of three ships fitted out from London to the whale-fishery, but unavoidably lost in the ice; and at the same time declared it lawful in future, for owners of fishing ships to insure the bounty†.

The British whale-fishery of 1758 was very unsuccessful, the weather was very stormy, and seve-

* Anderson's Commerce, A. D. 1755. † 28th Geo. II.

ral ships were lost; in 1762, it was also indifferent; and in 1764 it was again bad; many of the British ships returned home clean, and few of them made a saving voyage. The Dutch, at the same time, fished with little better success.

From this time (1764), the advantages and regulations attached to the northern whale-fisheries were continued, by act of Parliament, to the 25th of December 1767, from thence to the end of the following session of Parliament, and afterwards to the 25th December 1770*.

The King of Prussia interesting himself in the Greenland whale-fishery, caused some ships to be equipped from Embden in the year 1768†.

Some new regulations were introduced in Parliament in 1771, for the whale-fishers; the principal features of which consisted in the extension of the privileges of the next preceding acts, to every British built substantial vessel, manned, provided, and sent out, agreeably to the usual requisitions, for a term of five years; after which, the other privileges being the same, the bounty was to be reduced to 30s. *per* ton for another term of five years; and to 20s. *per* ton for a third term of the same duration. The whole awards and bounties of this act were then, that is in 1786, to terminate. It was also involved, that

* 4th Geo. III. c. 22.; and 8th Geo. III. c. 27.

† Ency. Brit. Art. *Cetology.*

every vessel of 200 tons claiming the above bounties, should be provided with four boats and thirty men, including the master, surgeon, and four apprentices; and that every ship of 200 to 400 tons burthen, should carry an additional boat and six men, for every 50 tons above 200.

Similar advantages, under certain restrictions, were extended, as on former occasions, to British Americans adventuring on the same fisheries *.

The liberal extension of the encouragements thus offered to adventurers in the whale-fisheries, was not carried in the House of Commons without considerable debate. A retrospect of the state, progress, and success of the British fisheries was produced, from whence it was apparent, that without Parliamentary encouragement, the trade could not be pursued but with great loss to the merchants; and that a more extended act than had usually been passed, would be productive of advantage, by securing to the adventurer such a continuation of the bounties, as would be sufficient to induce him to incur the extraordinary expence attending the equipment of ships adapted for this trade †. At the same time it was shewn, that during the twenty years, ending in 1769, since the bounty of 40s. *per* ton took place, there had been paid to the owners of

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* 11th Geo. III. c. 38.

† Macpherson's Annals of Commerce, vol. iii. p. 511.

the British whale-fishermen in England, the sum of 475,031*l.* 4*s.* 1*d.*, and in Scotland, 138,230*l.* 5*s.* 10*d.* During this period, the number of English ships (including repeated voyages,) engaged in the trade, amounted to 786 sail, and their burthen to 247,218 tons, and, at the same time, the number of Scotch ships was 229, and their tonnage 70,523.

This season (1771) 121 Dutch ships procured 14,320 barrels of oil, the produce of 500 whales. Three of these ships were lost after having captured fifteen whales.

The consumption of whalebone in the stiff stays used by the ladies, was at this period very great; in consequence of which, notwithstanding the increased importation from Greenland, Davis' Straits and the St Lawrence, this article still maintained a high price.

The method of shooting harpoons at the whale, from a sort of swivel-gun, was, in the year 1772, reintroduced. Indeed this instrument had been so long laid aside, that the present was considered as a new discovery, and probably was the sole invention of the manufacturer. The Society of Arts, after having witnessed two experiments with the harpoon-gun, which fully satisfied them of its efficacy; with a view to testify their approbation of the instrument, and to encourage the use of it, presented the inventor with a premium of twenty

guineas *. Still farther to prove its utility, the society ordered six of the guns, and twenty-four harpoons, to be put on board of the Leviathan, one of the London whalers, and the same on board of the Rising Sun; and to encourage the use of the instrument, the same society offered a premium of 20*l.* for the most satisfactory account of taking whales by the gun-harpoon; and, since this period, it has been in the constant habit of offering rewards to harpooners for taking whales by the same means.

In the year 1774, a company of merchants being associated in Stockholm, for the purpose of attempting the whale-fishery, were not only encouraged by the Swedish Government with the exclusive right to the fisheries of Greenland and Davis' Straits, for twenty years, but were likewise assisted with the loan of 500,000 dollars, at an interest of 3 *per cent.* †; thus evincing the powerful impression which the King of Sweden had in common with others, of the high national importance of this branch of commerce.

In an act passed for the encouragement of the Newfoundland fisheries in 1775, the bounties and other privileges awarded to the British whale-fishermen, were extended to the Irish ‡.

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* Transactions of the Soc. of Arts, vol. ii.; and Scots Magazine, vol. xxxvi. p. 392.

† Macpherson's Annals of Commerce, vol. iii. p. 557.

‡ 15th Geo. III. c. 31.

The Danes resumed the Greenland whale-fishery in the year 1775 *.

Whales having been discovered in various regions of the globe, and other establishments having been made besides the northern fisheries, all of which, in some degree, received the encouragement of the British Legislature, though not in the same proportion; and the different fisheries being subject to different regulations, under different acts of Parliament, it was found necessary to distinguish between them, and draw a line of separation. Accordingly, the latitude of 59° 30′ north was fixed as the southern limit of the Greenland seas; which seas, therefore, include the whole of the navigation north of this parallel, contained between the American coast on the west, and the European and Asiatic coasts on the east and north †.

The reduction of the bounty to 30s. *per* ton from the year 1777 to 1781 inclusive, was found to produce such a remarkable diminution in the number of ships employed in the northern whale-fisheries, that it was deemed necessary to increase it again to 40s., instead of reducing it still further to 20s. *per* ton, as was specified in a former act of Parliament. Thus the number of ships fitted out of Britain in the year 1775, was 105 sail, and the following year,

* Ency. Brit Art. *Cetology*. † 20th Geo, III. c. 60.

when the bounty was still at 40s., 98; but in 1781, after the bounty had been reduced during five years to 30s. the number of ships decreased to 39. In the same way, but in a greater proportion, the shipping increased, on the advance of the bounty again to 40s. *per* ton, which took place in 1782, so that, in 1786, they amounted to 185 sail.

As it was occasionally found to be a matter of some difficulty to procure the number of men required by law for the whale-fishing ships, at the ports where they were fitted, the above act of Parliament, besides renewing the highest bounty, permitted the ships to procure in Shetland or Orkney a part of their crew, not, however, exceeding two men for every 50 tons burden, and to land them at the same place on their return from the fishery *.

The revival of the whale-fishery was attempted by the late King of France, in his dominions, by equipping, at his own expence, six ships from the port of Dunkirk in 1784. This adventure was attended with tolerable success. By the way of enlarging the trade, and enhancing the probability of success, assistance was procured in 1786 from Nantucket, near Halifax in North America, several families belonging to which island, in consequence of the offer of peculiar immunities, were induced to settle at Dunkirk †.

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* 22d Geo. III. c. 19. † Ency. Brit. Art. *Cetology*.

" In the year 1785, the King of Denmark granted a bounty of about 30s. Sterling *per* ton to all vessels in the Greenland and Icelandic fisheries, on the condition of the ships being fitted out and their cargoes sold in a Danish port. Foreign built ships were employed, foreigners were encouraged to promote the view, and even foreign manufactures necessary for the Greenland fishery, were allowed duty free *."

With an act of the British Parliament of 1786, were connected several additional regulations, relative to the bounties offered to the Greenland and Davis' Straits whale-fishers; in which, the former acts being embodied and improved, it was rendered altogether so full, that it has ever since been considered as the fundamental act. By this statute, the bounty was again reduced to 30s. *per* ton for the five ensuing years,—ships of 150 tons burden, if manned and equipped in proportion, were entitled to receive it,—no ship, after the year 1791, however large, was to receive a bounty for more than 300 tons, unless employed in the fishery prior to the passing of this act. The act likewise declared and described how the vessels, to be properly qualified, were to be owned, built and navigated, and from what ports they might proceed,—it required, that each ship be visited by the proper officers of the customs, and surveyed, to

* Oddy's European Commerce, p. 525.

ascertain her suitableness and proper equipment, and certificate thereof to be given to the Commissioners of the Customs,—the owner and master then making oath of the nature and object of the voyage, and that it is "*on no other design or view of profit*," than the capture of whales and other creatures inhabiting the Greenland seas, and the master having given bond for his faithful dealings,—the Commissioners are required to grant licence for the ship to proceed. Each ship to be properly equipped, must be furnished with a certain number of officers, seamen, greenmen † and apprentices, boats, harpoons, lines, and other fishing stores, in propor-

* It is remarkable, that this clause should have existed; and much more so, that it should have been inserted after the passing of *acts* for the encouragement of discoveries of a northern passage into the Pacific, and a near approach to the Pole,—when it is considered, that by this clause, the whale-fishers, who, it was believed, could the most conveniently attempt such an enterprise, were the only persons prevented from pursuing such a "design or view of profit." The insertion of this sentence has evidently been intended, to prevent ships sent on other trading voyages from being benefited by the bounty act; and not to prevent attempts to make such discoveries as the Legislature offered premiums for accomplishing. In fact, the two acts, as they thus stand, if not incompatible, are at least inconsistent. Lately, however, this inconsistency has been pointed out to Government, and an exception has been introduced into the master's and owner's oath, as to any rewards offered by Government for the making of discoveries. (58th Geo. III. c. 15.)

† *Greenmen* are such seamen or landsmen as have not before been to the fishery.

tion to its tonnage, and a sufficient quantity of provisions for the voyage,—must sail, unless in cases of unavoidable necessity, by the 10th of April; and unless a certain specified success has been obtained, must remain within the limits of the Greenland seas until the 10th of August;—survey again to be made on the ship's return,—master and mate to make oath of their faithful attention to the provisions of the law; and must produce a log-book kept during the voyage, and make affidavit of the truth of its contents:—the ship then becomes entitled to the bounty, and the cargo is permitted to be imported free of duty. The act further states, that ships fitted out from Ireland may have bounty,—the bounty may be insured,—the ship's crew are protected during the voyage, and the officers in the coasting trade in winter,—the extent of the Greenland seas specified,—the Commissioners of the Customs to lay before Parliament, annually, an account of the ships employed in the fishery, with a statement of their success, &c.: And the act concludes with the appropriation of penalties,—defence to actions,—and the award of treble costs to defendants, where the plaintiff is non-suited *.

By accounts laid upon the table of the House of Commons this session, (1786), it appeared, that the

* 26th Geo. III. c. 41. § 1. to 21.—This important act, as far as it is yet in force, is given, in a condensed state, in the Appendix to this Volume, N°. I.

bounties granted for the encouragement of the British whale-fisheries carried on in the Greenland seas and Davis' Straits, from the year 1733, when bounties were first given, to the end of 1785, had amounted to 1,064,272*l.* 18*s.* 2*d.* for England, and 202,158*l.* 16*s.* 11*d.* for Scotland.

The limitation of the bounty to 300 tons, was found to be a necessary measure, in consequence of some very large vessels being sent out, with a design to enhance the benefit derived from the national *bonus*, without possessing the smallest advantage over vessels of more moderate dimensions, in their suitableness for the fishery. From a list published about this time, it appears, that in 1788, 255 British ships sailed for the whale-fishery, of which 129 were of a burden under 300 tons, 97 of 300 to 350 tons, 16 of 350 to 400 tons, 11 of 400 to 500 tons, 1 of 565 tons, and 1 of 987 tons *.

This season the French fitted out two ships for the Greenland fishery †.

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* These ships were fitted out of the following ports, viz.

From London,	91	From Exeter,	2	From Bo'ness,	4
Hull,	36	Whitehaven,	2	Glasgow,	4
Liverpool,	21	Stockton,	2	Montrose,	3
Whitby,	20	Scarbro,	1	Dundee,	3
Newcastle,	20	Leith,	6	Greenock,	2
Yarmouth,	8	Ipswich,	5	Grangemouth,	1
Sunderland,	8	Dunbar,	5	Queensferry,	1
Lynn,	6	Aberdeen,	4		

† Oddy's European Commerce, p. 525.

In 1789 an alteration took place in the regulation of the British fishery, relative to the time which the fishermen were obliged to stay in the Greenland seas, unless they procured a certain specified portion of success, by an enactment, that after the vessel had remained sixteen weeks in the Greenland seas, (reckoned from the time of sailing) she was at liberty to return home, and became entitled to the bounty, notwithstanding her success might be less than the limited quantity *. By the same act, masters of fishing ships were prohibited from permitting any indentured apprentice to quit his service before the expiration of his apprenticeship, under the penalty of 50*l.* for each offence, unless legally discharged or turned over; and no ship was to be entitled to bounty, unless the name of the ship were inserted in each apprentice's indenture †.

The acts for encouraging and regulating the fisheries in the seas of Greenland and Davis' Straits, were continued in 1791 with some trifling additions, for one year more.

The following session, the above and preceding regulations and indulgences were re-enacted, with the reduction of the bounty to 25s. *per* ton, from the 25th of December 1792 to the 25th of December 1795, and from this period until the expiration of the act in 1798, to 20s. *per* ton; at which latter rate it has continued ever since. By this act, ships

* 29th Geo. III. c. 53. † Id. § 5, 6, & 7.

not fitted out under the regulations for obtaining the bounty, if British vessels, and owned by British subjects, &c. were declared at liberty to fish for whales, and import the produce duty free, the crew to be protected during the voyage, and the officers in the winter season, in every respect the same as ships fitted out for the bounty. Whale-boats being of a construction adapted for the purpose of smuggling, were ordered to be laid up during the intervals of the voyages*.

Such great progress was made in the whale-fishery carried on by the Nantucket whalers, in vessels fitted out of Dunkirk, that instead of two ships which adventured in 1788, in the year 1793, 40 sail were equipped from this port. This trade, as then established, was profitable, and promised considerable national benefit; "in consequence, however, of the revolution, together with the peculiar state of the country since that period, it was suspended," some of the conductors of it returned to America, and the trade has not been yet revived†.

During the war in which Great Britain was at this time engaged, the manning of the Greenland fleet was found to be a matter of such particular difficulty, that the indulgence of making up the com-

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* 32d Geo. III. c. 22.

† Macpherson's Annals of Commerce, vol. iv. p. 285.

plement of the crew to the amount of three men for every 50 tons burden was granted; and the privilege of furnishing the requisite number of men, was extended to the Frith of Clyde and Loch Ryan, as well as the Shetland and Orkney Islands. These men being landed at their respective ports on the return of the ships, and a certificate thereof procured from the officers of the customs at the place, the bounty was to be granted, the same as if the whole crew had accompanied the ship throughout the voyage*.

In 1795, an act for a limited time was passed, encouraging inhabitants of the United Provinces (who had before been employed in the whale-fishery, or in certain occupations connected therewith,) to come over and engage in the whale-fisheries from England, endowing them, under certain restrictions, and after certain oaths made, with the same advantages as British subjects†.

The acts for the encouragement of the British whale-fisheries, as amended by the 32d Geo. III. c. 22. were continued in 1798, 1799, 1800, and in subsequent years, with little variation to the present time, except as to the following particulars.

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* 34th Geo. III. c. 22.

† 35th Geo. III. c. 56.—This act was revived and continued by different subsequent acts, until 25th March 1811, when it expired.

Until the year 1797, British built ships wholly owned by his Majesty's subjects, usually residing in Great Britain, Ireland, or the islands of Guernsey, Alderney, Jersey, Sark, or Man, registered, fitted out, and navigated, agreeable to the regulations of the 26th Geo. III. c. 41. and subsequent acts, were permitted to import into Great Britain, the produce of whales, seals, or other creatures, living in the seas of Greenland and Davis' Straits, or the seas adjacent, after certain oaths made by the master, &c. *free of all customs, subsidy or other duty*; but at the time of passing the tonnage-duty act of the 38th Geo. III. c. 76. an impost of 16s. 10d. *per* ton, was laid on train oil or blubber, fish-oil, or oil of seals, or other creatures living in the seas; and 3 *per cent. ad valorem*, on all other produce of the British northern whale-fisheries. In this act, the ambiguity and impropriety of considering *train oil* and *blubber* as similar articles, when the proportion of blubber to oil is as four to three*, occasioned a very inequitable application of the duty; for the northern whalers, who brought home their cargoes in blubber, paid the same duty *per* ton as the southern whalers, who brought theirs home boiled into oil; consequently, the former paid more duty by one-

* The proportion which blubber bears to oil, has always been considered by the Legislature, as the number 3 to 2; but it is found by experience, that four tons of blubber will generally produce three tons of oil.

fourth than the latter. This inequality was rectified by an act passed the 20th of June 1800, whereby blubber was permitted to be boiled into oil, under the inspection of the proper officers, and such oil admitted to entry, and the duty paid thereon *.

An act for granting to his Majesty certain duties on goods imported into, and exported from Great Britain, &c. includes a duty of 20s. 3d. *per* ton on train oil, fish-oil, or oil of seals, or other creatures living in the seas, not otherwise enumerated; 1s. 9d. *per cwt.* on whale-fins; 1s. each on undressed bear-skins, and 2d. each on undressed seal-skins†. But this act being superseded the following year by the *consolidation act* of the 43d Geo. III. c. 68. seems not to have been universally enforced on the produce of the whale-fishery ‡.

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* 39th & 40th Geo. III. c. 51. § 1.

† 42d Geo. III. c. 43. table (A.) inwards.

‡ The following are the duties which were imposed on Greenland produce by this act.

	Duty.			Drawback.		
	£.	s.	d.	£.	s.	d.
Train oil or blubber, or fish-oil of British fishing, the ton of 252 gallons, (on oil),	0	15	9			
(on blubber $\frac{2}{3}$)	0	10	6			
Ditto of foreign fishing (on oil) *per* ton,	21	0	0	14	0	0
Whale-fins of British fishing, (*per* ton) of 20 cwt. - -	1	10	0			
Ditto of foreign fishing, (*per* ton)	120	0	0	90	0	0

By the consolidation act of 49th Geo. III. c. 68., the duties on the produce of the Greenland and Davis' Straits fisheries, underwent different alterations; the duty on oil of British fishing was reduced from three farthings *per* gallon (15s. 9d. *per* ton) to one farthing, with the addition of 1*s.* 9*d.* *per* ton in time of war*.

The following are the alterations, additions, limitations, emendations, &c. which have recently been adopted in Parliament, for the regulation of the northern whale-fisheries.

In 1802, the number of fishing officers to be protected from the impress during the voyage and in the winter season was limited; ships completing their crews in Orkney or Shetland, allowed to take *two* men for every 50 tons; and owners unavoidably absent, permitted to make the necessary affidavits, required before the sailing of their ships, in the presence of a justice of the peace†. In 1803, whale-oil, blubber, and fins, &c. permitted to be landed and warehoused, without the duties being first paid‡. In 1806, whale-fishing ships allowed to complete their crews, not exceeding *three* men

* For the particulars of this act, which contain the duties now leviable on the produce of the fisheries, see the Appendix, N°. I. to this Volume.

† 42d Geo. III. c. 22. § 2, 3, 4.

‡ 43d Geo. III. c. 132. § 4 & 5. tab. D.

for every fifty tons, in certain ports of Orkney, Shetland, &c. the act to continue in force until the signature of preliminary articles of peace *. In 1809, certain affidavits were required from the master, and proprietor or consignee, of the whale-fishing ship and cargo, to prove that the articles therein imported were taken by the crew of the said British built vessel, manned and navigated according to law, owned by British subjects, &c. otherwise the cargo to be charged with the duties of foreign produce †. In 1810, act 26th Geo. III. c. 41. with the various emendations, &c. continued to 25th March 1815 ‡. In 1815, the foregoing acts continued until the 25th of March 1820; and also the northern whalers permitted to complete their crews in Orkney or Shetland, &c. in the same proportion and manner as in time of war §; and in 1818, the obnoxious oath, required to be taken by the masters and owners of the fishing ships, that they proceeded "*on no other design or view of "profit,*" than taking whales, &c. was modified, and an exception made as to the making of discoveries, or seeking after any rewards offered by Government, for "more effectually discovering the longitude at

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* 46th Geo. III. c. 9. § 1 & 2.

† 49th Geo. III. c. 97. § 37.

‡ 50th Geo. III. c. 11.

§ 55th Geo. III. c. 39.

" sea, or encouraging attempts to find a northern pas-
" sage between the *Atlantic* and *Pacific* oceans, and
" to approach the northern Pole *."

Scarcely was the peace of Europe established, before the Dutch Legislature proposed a bounty for the encouragement of the whale-fishery from their dominions. No ship was fitted in 1815, and only one in each of the three following years, though the bounty was extremely judicious and liberal. The encouragement offered in 1815, was as follows: Each ship fitted for the whale-fishery from Holland, was entitled to 4000 *f.* on the outfit, during her three first voyages, and 5000 *f.* more, if she returned *clean*. If she procured a cargo of 100 quardeelen of oil, she was entitled to no additional bounty; but for every quardeel† she fell short, an additional bounty of 50 f. was due. Thus, a ship with 10 quardeelen of oil, received 4500 *f.* additional bounty; with 20, 4000 *f.*; with 30, 3500 *f.*; with 40, 3000 *f.*; with 50, 2500 *f.*; with 60, 2000 *f.*, and so on. Hence, a clean ship becomes entitled to a bounty of 9000 *f.* ‡ equal to about 750 *l.*, and a ship with 100 quardeelen of oil, to 4000 *f.*

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* 58th Geo. III. c. 15. § 1. & 2.

† The quardeel of oil contains 12 steeken Dutch, or 60. 27 gallons English.

‡ Reckoning the value of the florin, =20d. English, 9000 *f.* is just equivalent to 750 *l.* Sterling.

or 333*l.* 6*s.* 8*d.* The Government also permitted the introduction of British officers into their ships, the art of the whale-fishery among the Dutch having been long on the decline.

CHAPTER II.

COMPARATIVE VIEW OF THE ORIGIN, PROGRESS, AND PRESENT STATE OF THE WHALE-FISHERIES OF THE DIFFERENT EUROPEAN NATIONS.

HAVING now, so far as my materials extend, brought down the account of the northern whale-fisheries in chronological order, it may not be amiss, before entering upon the practice of the whale-fishery, to give a short retrospect of the establishment of this trade, and of the progress made in it by different nations. This view of the subject, besides enabling the reader to draw a comparison of the perseverance and abilities evidenced by the different powers engaged in this adventurous employment, will likewise admit of a variety of interesting tables and deductions, which could not with such propriety be introduced into the chronological history.

The first intimation we have of the human race being found sufficiently courageous and enterpri-

sing, to attack the mysticetus, is derived from Alfred the Great's account of the voyage of Ohthere the Norwegian, performed in the ninth century. Though at the first sight, there may appear some inconsistencies in Ohthere's narrative, yet with the explanation I have already suggested, I conceive, that the account of the prosecution of the whale-fishery by the Norwegians, at this early period, may be considered in the main points as authentic.

Four or five centuries later, we learn from various historical notices, that the whale-fishery, as a general occupation, was practised by different nations of Europe, particularly the French, Spaniards, Flemings, and probably the English; and that, in the course of the sixteenth century, the Basques and Biscayans had established a successful fishery for the fin-whales on their own coasts, and subsequently pursued them, first to the coast of Iceland, where the co-operation of the Icelanders was procured, and ultimately to the neighbourhood of Greenland and Newfoundland.

Each of the nations which have at different times attempted the Greenland fishery, will meet with a share of our attention, and will be considered in the order of their arrival on the coast of Spitzbergen.

SECT. I.

Whale-Fishery of the British.

THE Greenland or Spitzbergen whale-fishery of the English, claims our first attention, both on account of its greater antiquity, and its present superiority over that of other powers.

At what period the English first embarked in the fishery of the whale, as an occupation, is not very certain. Several ancient charters, acts and grants of the realm, speak of whales *taken* or *captured*, as well as of whales stranded, particularly an act of Edward II.; but whether the fishery was then practised, or these words were introduced, on the supposition that it might be prosecuted, is not easy to determine. We well know, however, from unquestionable authority, that, attracted by the prospect of an occupation, though hazardous, at once novel and advantageous, the English, towards the close of the sixteenth century, procured the assistance of some Biscayans, fitted out some ships, and first commenced the whale-fishery near Newfoundland. The fishery for the walrus, seal, and some species of whale, about the North Cape and Cherry Island, in which they were shortly afterwards engaged, together with the frequent voyages of discovery, under-

taken at the expence of the Russia and East India Companies, were the means of leading them to the coast of Spitzbergen, soon after its re-discovery by Hudson in 1607, where they soon relinquished the capture of these smaller animals, for the more profitable fishery of the mysticetus.

They did not, however, immediately abandon the design of making discoveries; for we find that one or two discovery vessels were generally attached to every whale-fishing expedition sent out by the Russia Company.

The first expedition of this company was particularly unfortunate, as far as concerned their ships, as they were both wrecked. The first was driven on shore by the ice in a rocky bay at Spitzbergen, and the other upset and sunk. Their crews were all saved and taken home, together with the most valuable part of the produce of their fishing, by a Hull ship, which providentially happened to be on the coast of Spitzbergen at the time. Captain Jonas Poole, who, at the time of the loss of the second vessel, was in the hold, had a most miraculous escape. The vessel having been brought too light, she suddenly heeled to one side, the few goods in the hold slid to leeward, and the water began instantly to pour down the hatches. Poole struggled to get upon the deck, but was twice beaten back by the falling of casks and the force of the water, which rushed in torrents upon him; but at length.

though with broken ribs and other serious wounds, he was enabled to extricate himself from the vessel, and was picked up by one of the boats, and his life preserved.

In the fishery at Spitzbergen, the assistance of Biscayans was still required, as well by the English as by the other nations of Europe, which speedily embarked in the same speculation; and it was some years before any of them ventured on the fishery, relying on the strength of their own unsupported abilities.

Scarcely had the English established themselves in the Spitzbergen whale-fishery, before the Dutch and Spaniards followed their example; and after them immediately succeeded the French, Danes and Hamburghers.

The Russia Company, in consideration of their having originally discovered and established this commerce, and likewise of having incurred considerable expence in sending out ships on voyages of discovery to the Polar Seas,—deemed themselves entitled to the sole right of the Spitzbergen whale-fishery; and hence it was, that when the Dutch appeared as their competitors, the first year they drove them out of the country, and the second, being confirmed in the right to a monopoly of the trade, by Royal Charter, A. D. 1613, they equipped an armed fleet, and drove out of the country fifteen sail of ships belonging to different nations, some of

which they rifled, not excusing even their own countrymen, and permitted some French ships only to pursue the fishing along with them, on the consideration of a tribute of eight whales, which the French agreed to pay to them.

The two years next following, their success was indifferent; but in 1616 and 1617, they procured superabundant cargoes; twenty-two ships and four pinnaces which they employed in the two years, having made upwards of 3100 tons of oil.

The East India Company, who had joined the Russia Company in various northern voyages of discovery, whereby they are said to have incurred an expence of 120,000 *l.*, likewise joined them in the Greenland fishery; which branch of commerce was, for a short time, prosecuted by the two companies in combination. They fitted out thirteen ships in the year 1618, which proved an unfortunate adventure; for the Dutch being exasperated at the seizure of their oil and fishing utensils on three several occasions, had assembled an armed fleet, with the ostensible view of protecting their fishery; but finding a favourable opportunity for making reprisals, they attacked the English, killed a number of their best men, and captured one of their ships, which, however, on its arrival in Holland, was liberated by the Dutch Government. These differences between the English, Dutch, and other powers, were at length settled, by making a division among the dif-

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ferent nations, of the numerous bays and harbours in Spitzbergen, which were convenient as fishing stations; the first choice and greatest proportion of which were allowed to the English.

By this time, the English alone had discovered the bays and harbours along the west coast of Spitzbergen, and the land to the northward of 80°; Witches Island, and others as far north as 79°; Hope Island, Edges Island, and various others to the eastward *.

A second bad fishing voyage having been made by the united English Company, they were induced to relinquish the trade. Four members of the Russia Company then took it up on their own account, and sent out seven ships in 1620, eight ships in 1621, and nine in 1622, which procured in the three years 3100 tons of oil; but they had indifferent or bad success the year afterwards, and the produce of the whales, on account of the great quantity imported by the Dutch, becoming less valuable, they likewise abandoned the speculation.

At the time the fishery was in its most flourishing state, when the Dutch fished with such success

* Purchas's Pilgrimes, vol. iii. p. 462,-473.—Thus it appears that the English, and not the Dutch, as is often believed, were the explorers and surveyors of the whole, or greater part of Spitzbergen, and the adjacent islands; the principal examination of this country by the Dutch, which, indeed, consisted only of a part of the west coast, having been performed, on its first discovery, by Barentz and Heemskerke.

that they realized immense profits,—the English, when they sent out vessels, were so commonly unsuccessful, that little incitement was offered to the commercial part of the nation, to hazard their property in the business.

The grant of the whale-fishery to the Russia Company was renewed in 1635, by Charles the First, but it does not appear that any revival of the trade was the consequence. Thus this trade, which some nations found to be particularly advantageous, was so nearly laid aside by the British, that for a number of years they made no spirited or effectual attempt to revive it; but merely sent a few occasional ships, and sometimes had none on the fishery, when the Dutch and Hamburghers employed between three and four hundred sail. The Legislature, fully impressed with the importance of the speculation, in 1672, gave a general encouragement to adventurers, by allowing the importation of Greenland produce free of duty, and by granting a limitation of the rigours of the navigation act, whereby the speculators might avail themselves of the assistance of experienced foreigners, to the amount of one-half of the crews of the ships employed in the fishery. This had the effect of producing a few private attempts to revive the trade, but still it seems with such general ill success, that after seven years it was again abandoned. As the Greenland trade then sunk entirely into disuse, the plan of a joint stock com-

pany was once more resorted to, as offering one of the most probable means of effecting the wishes of the Government in its renewal. Accordingly, towards the end of the seventeenth century, a company of forty-two persons, who had subscribed 40,000 *l.* for the purpose, were incorporated by act of Parliament, for a term of fourteen years, and endowed with various privileges. Though the company made use of their privilege, in employing a number of foreign fishermen, equipped several ships, increased their subscriptions to 82,000 *l.*, and thus had every apparent chance of success, yet, before the termination of their charter, their capital, we are informed, was totally expended, and their trade and expectations completely blasted.

The whale-fishery commerce again lay dormant for several years, when the South Sea Company, after a length of time spent in discussion and indecision, took it up, and, in the year 1725, sent a fleet of twelve new ships of 300 tons burden each, to Greenland, and afterwards increased it to twenty-two sail. After they had persevered for eight years, in which time a very large sum of money was lost, this company, like all the former adventurers, found it necessary to give up the trade.

The almost universal failure of the English in the whale-fishery, to this period, and the general good success of their contemporaries, has excited much astonishment. About the time that the English

joint-stock company sunk a capital of 82,000*l.*, the Dutch, in the course of ten years, included between 1699 and 1708, equipped 1652 ships, which caught 8537 whales; the produce whereof sold for 26,385,120 florins, of which, the sum of 4,727,120 florins, was clear gain*. And, at the same time that the South Sea Company suffered vast loss in their whale-fishing speculation, the Dutch almost invariably were gainers by it. To attribute the difference which thus existed, between the success of the Dutch and the English, to a deficiency of personal courage or natural intellect on the part of the latter, would not be an agreeable solution, neither would it be altogether correct; nevertheless, it is very evident, that the spirit and energies of the Dutch, were, in general, both better directed and better followed up. Indeed, the result of their fishing proves, that the character given by historians, of the Dutch in the seventeenth century, must be correct; namely, that this nation was, at the period alluded to, one of the most hardy and enterprising in the world.

Various opinions have been suggested as to other causes of difference in the success of the English and Dutch whale-fishers. Some of these will be considered.

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* Histoire des Pêches, vol. i. p. 297.

I. The interest of money in Holland was, at this time, much lower than in England.

II. Their export trade in articles the produce of the Greenland seas, occasioned their enrichment at the expence of other nations, and the value of oil and whalebone was kept up, by not being allowed to accumulate in the market at home.

III. Their seamen and fishing-officers were chiefly natives; this exempted them from the great expence of hiring foreigners, to which the British, until after the establishment of the bounty system, were constantly subjected*.

IV. The Dutch built their ships at a cheaper rate than the English, and practised greater frugality in their equipment †.

V. They suffered little loss with an unsuccessful voyage, as the different tradesmen who supplied their ships with provisions and stores, were in the habit of venturing their goods on the success of the voyage, receiving nothing if the vessel returned clean, but a very large profit if she procured a full cargo ‡.

Had the Dutch possessed all these advantages in reality, their superiority to the English in the fishery, would be no longer surprising. Some of these

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* Macpherson's Annals of Commerce, vol. iii. p. 130.

† Elking's View, &c. p. 49,-50.

‡ Macpherson, vol. iii. p. 130.

points, however, are not correct, as appears from the statements of Elking, in his "View of the Green-"land Trade and Whale-fishery," who attempts to prove, that the English "are able to carry on the "fishery trade to more advantage than any other "nation." The first point of advantage the Dutch have been supposed to possess over the British, Elking does not allude to. As to the second, while he admits the fact, he shows it may be equally applied to the benefit of the British*. The third he denies, observing, that the Dutch have not a sufficient number of seamen among their own subjects, but are obliged yearly, to have many thousands of the most necessary and skilful hands from Jutland, Holstein, Scotland, Norway, Bremen, Oldenberg, &c. who, after the fishery is over, carry the money they have earned back with them, and thereby serve to impoverish the country in one way, while, by their services, they enrich it in another. The fourth point, Elking likewise combats. If their ships be cheaper than the English, he contends, that they are all less durable and not so strong †. He denies that they can fit them cheaper, having scarcely any article suitable for building or equipping a ship which is the produce of their own country. Hence, they must import iron, timber, planks, masts, hemp, tar, and almost every kind of provisions, all of which,

* Elking, p. 57. † Idem, p. 50.

either Britain or the colonies produce *. Besides, wages of *seamen*, he declares to be lower in England than in Holland. In the former, they are hired for 24*s.* or 26*s. per* month; in the latter, their ordinary pay is 16 to 18 or 20 guilders *per* month, which is from 30*s.* to 40*s.* Sterling †. On the other hand, he also shows, that the English have many advantages over the Dutch, particularly as far as regards the ease with which the ships may be loaded and discharged, compared with the Dutch, who have much expence in this respect ‡; and, on the whole, he concludes, that the English might save at least 50*l. per* ship on every voyage, which the Dutch are obliged to pay §. The fifth point being equally practicable in Britain as in Holland, requires no reply. If Elking's view of the subject be correct, therefore, we are brought again to the point where we commenced, and must attribute the inferiority of the success of the English in the fishery at this period, to a deficiency in the qualifications of the persons commanding the ships, or to the unskilfulness of their crews; to their want of perseverance and confidence; or to their energies being ill applied, or imperfectly followed up. And that some, or all of these causes, then operated in producing the effect, appears from the present state

* Elking, p. 51. † Idem, p. 53. ‡ Idem, p. 54.
§ Idem, p. 55.

of the fishery. The Dutch are now as much behind us in the whale-fishery, as they were, at the period referred to, our superiors.

Every encouragement which had yet been offered by the British Government to adventurers in the whale-fishery, being found inadequate to effect its establishment on such a scale, as to become of any national advantage, trial in 1733 was made, of a plan originally proposed by the South Sea Company; which was, in addition to other privileges, to incite the merchants to speculate in the trade, by a bounty of 20*s.* *per* ton, on the burden or admeasurement of the ships engaged in it. As the trade, however, still continued very feeble, the bounty, after seven years, was increased to 30*s.* *per* ton, and yet only from three to six sail of ships continued to be employed until the year 1749. This being the case, a farther increase of 10*s.* *per* ton was made to the existing bounty; in consequence of which, the English fishery began to increase and flourish, and the merchants of Scotland began to participate in the trade. The acts of Parliament, by which these bounties were secured to adventurers, were afterwards subjected to various revisions and limitations, for the purpose of the more economical application of the money thus expended. The trade being then, to appearance, fully established, it became a subject of parliamentary discussion,—the propriety of retrenching the expence to which the nation had

become subjected, by the liberal encouragement given to the whale-fishers in the way of bounties. This expence was found to be very great. In twenty years, included between 1750 and 1769, 613,261*l.* 9*s.* 11*d.* had been paid in bounties to British whale-fishers; the average number of vessels employed during that period being $39\frac{7}{10}$ from England, and $11\frac{3}{10}$ from Scotland, and the average sum paid annually in bounties to both, being 30,663 *l.* 1*s.* 6*d.* This great expenditure, together with the belief that the intention of Government in the effectual establishment of the fishery was fulfilled, occasioned the bounty to be reduced to 30*s.* *per* ton; but the number of British whale-fishermen having diminished from 98 to 39, in the course of the five years following, the bounty was again raised to 40*s.*

"It was afterwards found, however, that so great a bounty was neither necessary to the success of the trade, nor expedient with regard to the public. In 1786, therefore, the acts conferring the said emoluments being upon the point of expiring, the subject was again brought under the consideration of Parliament; and it was proposed to continue the former measures, but with a reduction of the bounty from 40*s.* to 30*s.*" In proposing this alteration, it was stated, "That the sums which this country had paid in bounties for the Greenland fishery, amounted to 1,265,461 *l.*; that, in the last year (1785), we had

paid 94,858 *l.*, and that, from the consequent reduction of the price of the fish, the public at present paid 60 *per cent.* upon every cargo. In the Greenland fishery, there are employed 6000 seamen, and these seamen cost Government 13*l.* 10*s.* *per* man *per annum*, though we were never able to obtain more than 500 of that number to serve on board our ships of war. Besides, the vast encouragement given to the trade, had occasioned such a glut in the market, that it was found necessary to export considerable quantities of it, and thus we paid a large share of the purchase-money to foreign nations, as well as for our own people, besides supplying them with the materials of several important manufactures." This proposition was opposed by several members, but was finally carried; and the propriety of the measure became very soon apparent. At that time, the number of ships employed from England in the whale-fishery to Greenland and Davis' Straits, amounted to 162, besides 23 from Scotland *. The proposed alteration took place the following year (1787); and notwithstanding the diminution of the bounty, the trade increased; the number of ships fitted out of British ports the same year, amounting to 250, and the next year to 255; "the cargoes of which, in 1788,

* Encyc. Brit. 4th edit. Art. Cetology.

consisted of 5989 tons of clean oil; 7654 cwt. of whalebone, besides 13,386 seal-skins *."

* "The quantity of whale-oil imported into Great Britain, in the year 1787, was,

	Tons.	Hds.	Galls.
From Greenland, -	9905	1	51
Southern Fishery,	2184	1	25
British Colonies,	3447	0	43
——— West Indies,		2	43
States of America,	230	1	36
Denmark, - -	7	0	0
France, - -	22	3	22
Ireland, - -	11	1	0
Total imported,	15,809	0	31

From these and other places, the quantity of train oil imported into Great Britain in the succeeding years, was,

In	Tons.	In	Tons.
1788, -	15,677	1795, Prize,	166
1789, -	14,127	1796, -	11,437
1790, -	12,539	Prize, -	206
1791, -	10,740	1797, -	13,599
1792, -	10,739	Prize, -	3
1793, -	11,661	1798, -	12,132
Prize, -	247	1799, -	12,990
1794, -	10,899	Prize, -	22
Prize, -	101	1800, -	13,236
1795, -	10,024	Prize, -	33

Of the above was British produce, and exported according to the official rates,

In		In	
1797, -	17,600 *l.*	1801, -	61,892 *l.*
1798, -	28,510	1802, -	147,868
1799, -	31,334	1803, -	41,228 †
1800, -	105,770		

† Oddy's European Commerce, p. 533.

At length, when the British had become well accustomed to the whale-fishery, and the trade was to appearance so firmly established as not to be affected by any trivial alteration of the bounties, this emolument was, in December 1792, reduced to 25*s.*, and in 1795, to 20*s. per* ton, at which rate it has subsequently continued. Some alterations have, however, occasionally taken place in the acts relative to the bounties, and a small duty has been imposed upon whale-oil, fins, and other produce of the Greenland seas.

Thus, by means of national support to the whale-fishers in the form of bounty, was effected, what no other incitement was calculated to accomplish, namely, the establishment of the northern whale-fisheries by British subjects, on a basis so firm as to secure to the nation every advantage which could be expected from such a trade, in the most permanent way.

It has been seen that, in point of ability for conducting the whale-fishery, the British, in their early attempts, excepting a few of the voyages of the Russia Company's ships, were universally eclipsed by the Dutch; and that, notwithstanding the English led the way to the haunts of the whale in the northern regions, and set the example of capturing this animal as an occupation;—yet their labours were attended with such ill success, and their exertions were in consequence so much relaxed, that

instead of becoming experienced in the trade, they soon lost the little advance which they had made in the art, while they were under the direction of the Biscayans; and, in consequence, were long under the necessity of hiring a great number of foreigners, to assist them in the fishery. This obligation of the British to employ the Dutch as fishing-officers in their ships, was probably the occasion of a popular mistake, that the Dutch were the first whale-fishers at Spitzbergen. But, after the bounty system had been established a few years, the British became as expert in the fishery as the Dutch, and the two rival nations probably exercised an equal talent for many years afterwards. The talent for the whale-fishery among the Dutch, however, was on the decline; and in consequence of the imitation of their manner by the British, in the middle, and indeed so late as the ninth decade of the last century, the energies of the fishermen were never brought into action. The Dutch, from indulging a habit of coolness, became inactive, and the British too closely copied their example. About the close, however, of the century, two or three of the captains of the whale-fishing ships, men of abilities, commenced a system of activity and perseverance, which was followed by the most brilliant result. Instead of being contented with two or three large fish, and considering five or six a great cargo, they set the example of doubling or trebling

the latter quantity, and were only contented, so far as to relax their exertions, when their ships could contain no more. Thus arose a striking epoch in the history of the fishery. The ease, coolness, and inactivity of the Dutch, were superseded by the system of perseverance and exertion, which has continued increasing ever since, until, at the present day, it has become very general throughout the fishery.

As the Greenland and the Davis' Straits fisheries have met with similar encouragement from the British Government, are regulated by the same laws, and prosecuted in a similar way, they have generally, in the preceding pages, been considered in combination. The fishery of Spitzbergen, or the Greenland fishery, as it is generally called, having preceded the fishery of Davis' Straits about a century, must be considered as solely treated of during that interval after its establishment. From the various publications by the Dutch on the subject of their whale-fishery, I can trace their progress and success in the most satisfactory manner, from their first establishment of a fishery at Davis' Straits, in 1719, down to the year 1795; but the precise year in which the English commenced it, or the degree of success they met with in their first attempts, I have not been able to ascertain.

It does not appear, that any attempt was made by the inhabitants of SCOTLAND in the whale-fishery of Greenland or Davis' Straits, until the bounty system was established. Some merchants of Edinburgh, who had formed themselves into a company in September 1749, for the purpose of trying this fishery, sent out a ship from Leith, being the first from Scotland, in the following spring. It failed in the whale-fishery, and brought home nothing but a few sea-horses. Its want of success was ascribed to the lateness of its arrival on the fishing stations, and to its having been for some time beset in the ice, at the distance of only nine degrees from the Pole. The company, so far from being discouraged by this failure, sent out two ships the next year; but the voyage proved more disastrous than the former, as one of the ships was wrecked, and the other again returned home clean. Still, however, they persevered in the trade, and, determined, if possible, to retrieve the loss they had already suffered, they equipped three ships in 1752, all of which returned successful. In order to encourage this trade, many of the ladies of Edinburgh got their stays and hoops made of the whalebone brought home by their own ships *.

The trade soon became more general in Scotland. A company was formed in Aberdeen, and a new

* Scots Mag. 1749–1752; & Gent. Mag. 1752.

company in Edinburgh, and vessels were fitted from Leith, Aberdeen, Glasgow, Dundee, Dunbar, Borrowstounness and Greenock. Their success in 1753 was 61½ whales, and in 1754, 36 whales, of which 18 belonged to the Edinburgh Companies. In 1755, 15 ships from Scotland procured 41 whales, 1 bottlenose, and 1 seahorse; and in 1756, the fishery was generally successful. Until the year 1763, the whale-fishery from Scotland employed 14 to 16 sail of ships, but for upwards of 20 years after this period, not more than 10 ships were sent out annually, and sometimes only 3 or 4. In 1785, the trade began again to flourish, and in the year 1787, 31 ships were sent out, which caught 84 whales and 6571 seals; the produce of which was about 2548 butts, or 1274 tons of blubber, being equal to about 33 or 34 tons of oil *per* ship; and in the following season, the same number of vessels caught 62 whales. Above 200 sail of ships proceeded to the fishery from England at this period. Between the years 1750 and 1788, 2449 whale-fishing ships, burden 740,065 tons, were fitted out from the ports of England, including repeated voyages, and 430 ships, burden 130,998 tons, from the different ports of Scotland. The bounties paid to the owners of these vessels, in the course of the above interval of 39 years, amounted to 1,335,098*l.* 1*s.* 2*d.* for England, and 242,837*l.* 19*s.* 2*d.* for Scotland. The official value of the produce of the

whale-fisheries imported into England in the 41 years, included between 1760 and 1800, was 2,144,387*l.* 8*s.*; and into Scotland in the 32 years, included between 1769 and 1800, was 381,374*l.* 10*s.* 3*d.* The official value of exports from England during the former period, chiefly consisting of rum for stores, was about 16,000*l.*

The following table, extracted from Macpherson's Annals of Commerce, shows the number of ships, and the amount of their tonnage, employed in the British Greenland and Davis' Straits whale-fisheries, together with the sums paid in bounties, during a period of 39 years.

It will, however, be observed, that the bounties paid do not always correspond with the tonnage of the vessels employed. This arises from some of the vessels having been lost; some having forfeited the bounty; and others having been of a greater tonnage than 400 tons, for the excess above which, no bounty was paid, after the year 1757.

VIEW of the Extent of the BRITISH GREENLAND and DAVIS' STRAITS WHALE-FISHERIES.

ENGLAND.						SCOTLAND.					
Year.	No. of Ships Employed.	Tonnage.	Bounties Paid. L.	S.	D.	Year.	No. of Ships Employed.	Tonnage.	Bounties Paid. L.	S.	D.
1750	19	6,264	10,507	3	3	1750	1	333	666	0	0
1751	23	7,360	16,530	19	10	1751	6	1,933	3,866	2	11
1752	30	9,871	17,231	9	5	1752	10	3,137	6.274	2	11
1753	35	11,814	27,693	0	11	1753	14	4,294	8,589	5	0
1754	52	17,235	31,328	6	9	1754	15	4,680	9,361	5	0
1755	66	21,293	45,634	18	8	1755	16	4,964	9,929	5	0
1756	67	21,328	42,103	1	0	1756	16	4,964	9,315	5	0
1757	55	17,221	34,450	0	0	1757	15	4,530	8,567	13	4
1758	52	15,399	27,006	6	1	1758	15	4,499	8,271	13	4
1759	34	10,337	19,273	18	1	1759	15	4,479	8,959	13	4
1760	40	12,082	20,540	5	6	1760	14	4,238	8,477	13	4
1761	31	9,789	19,247	15	8	1761	14	4,238	8,477	13	4
1762	28	8,877	13,358	6	9	1762	14	4,238	8,045	13	4
1763	30	9,416	18,465	15	9	1763	10	3,109	5,649	0	0
1764	32	10,261	19,463	16	1	1764	10	3,140	6,281	0	0
1765	33	10,099	18,748	17	9	1765	8	2,559	5,119	0	0
1766	35	10,015	19,947	2	5	1766	9	2,797	5,595	0	0
1767	39	12,284	24,537	9	2	1767	9	2,797	5,595	0	0
1768	41	12,802	24,026	18	1	1768	9	2,797	5,595	0	0
1769	44	13,471	24,935	12	11	1769	9	2,797	5,595	0	0
1770	50	14,775	29,240	18	11	1770	9	2,797	5,595	0	0
1771	50	14,760	27,891	7	6	1771	9	2,797	5,595	0	0
1772	50	15,378	29,089	12	11	1772	9	2,797	5,595	0	0
1773	55	16,712	31,231	13	9	1773	10	3,016	6,033	0	0
1774	65	19,770	37,863	2	6	1774	9	2,773	5,547	0	0
1775	96	29,131	54,978	13	10	1775	9	2,773	4,503	0	0
1776	91	27,047	52,028	3	1	1776	7	2,251	4,503	0	0
1777	77	21,917	30,942	5	3	1777	7	2,251	2,880	15	0
1778	71	20,291	29,280	8	4	1778	5	1,587	1,923	15	0
1779	59	16,907	25,294	16	1	1779	3	957	1,435	15	0
1780	52	14,900	21,584	12	4	1780	4	1,282	1,923	15	0
1781	34	9,859	14,379	12	4	1781	5	1,459	2,189	5	0
1782	38	11,122	21,156	2	2	1782	6	1,764	2,190	0	0
1783	47	14,268	27,017	12	6	1783	4	1,095	2,190	0	0
1784	89	27,224	53,162	2	1	1784	7	2,047	4,094	10	0
1785	136	41,741	84,122	6	2	1785	13	3,865	7,729	16	0
1786	162	49,426	101,996	9	6	1786	23	6,997	13,993	19	4
1787	219	64,280	95,038	17	1	1787	31	9,057	13,454	19	6
1788	222	63,399	93,768	0	9	1788	31	8.910	13,230	3	6
	2449	740,065	1,335,098	1	2		430	130,998	242,837	19	2

From the year 1810 to 1818 inclusive, 824 ships sailed from England to the whale-fisheries of Greenland and Davis' Straits, and 361 from Scotland*. In the four years ending with 1817, 392 vessels sailed from England to these northern fisheries, the amount of whose cargoes was 3348 whales, besides seals, narwhales, bears and seahorses; and the produce 35,824 tons of oil, and about 1806 tons of whalebone, together with a quantity of skins. The average quantity of oil produced *per* ship on each voyage, was 91.4 tons, and about 4 tons 12 *cwt.* of whalebone. From Scotland there sailed in the course of the same period of four years, 194 vessels to the whale-fisheries, the amount of whose cargoes was 1682 whales, &c., and the produce 18,684 tons of oil, and about 891 tons of whalebone, besides skins.

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* The number of ships fitted out each year from England and Scotland, was as follows:

	1810	1811	1212	1813	1814	1815	1816	1817	1818
From England,	75	76	83	94	97	98	97	100	104
Scotland,	22	22	27	43	46	49	49	50	53

The number of vessels sent out from each of the different ports of England and Scotland during the above period of nine years, including repeated voyages, was as follows:

From Berwick,	16	Newcastle,	43	Kirkaldy,	7
Grimsby,	13	Whitby,	80	Kirkwall,	6
Hull,	481	Aberdeen	98	Leith,	79
Liverpool,	17	Banff,	8	Montrose,	25
London,	161	Dundee,	68	Peterhead,	62
Lynn,	13	Greenock,	8		

The average cargo procured *per* ship on each voyage, produced 96.3 tons of oil, and about 4 tons 12 *cwt.* of whalebone; being the same quantity of whale-bone, but 4.9 tons of oil more than the average procured by the English fleet during the same time*. It therefore appears, that of late years, the people of Scotland have sent out their full proportion of ships on the fisheries; and with a degree of success which has been equal, if not superior, to that of the English fishers.

The British whale-fishery of 1814 was uncommonly prosperous, especially at Greenland; 76 ships on this fishery having procured 1437 whales, besides seals, &c., the produce of which in oil only, was 12,132 tons, being an average of $18\frac{9}{10}$ fish, or 159.6 tons of oil *per* ship! The average fishery of Davis' Straits the same season, was about one-third less *per* ship. The gross value of the freights of the British Greenland and Davis' Straits fleets, (bounties included,) estimating the oil at 32 *l. per* ton, which was about the average price, and the

* These results together, with all the others immediately following, which refer to the four years ending with 1817, I have extracted out of an interesting "Account of the number of *Fish*, with the produce of *Oil* and *Bone* brought by each ship from the Greenland and Davis' Straits Whale-fisheries," for the years 1814,–15,–16,–17, made up, with great care, and published yearly, by Messrs Devereux and Lambert, London.

whalebone at 80*l.* *per* ton, exceeds in this one year 700,000*l*!

Though the profits to the merchants on this occasion were singularly great, yet, on the average of the four years, ending with 1817, we find the cargoes brought from Greenland and Davis' Straits were only 93 tons of oil, and 4 tons 12 cwt. of whalebone *per* ship, value about 3700*l.* This, though a degree of success which would have been considered as very great fifty years ago, is now, on account of the extraordinary increase which has taken place in the expences of a whale ship, but barely sufficient to afford an encouraging profit to the adventurers. But when we consider, that while the general profit reaped from the trade was only moderate, some individuals and concerns have been almost invariably successful; it is clear, therefore, that some others must have been considerable losers by this speculation.

In a national view, however, the benefit has been very different. In the five years ending with 1818, about 68,940 tons of oil, and 3420 tons of whalebone, of British fishing, have been imported into England and Scotland. If we calculate the oil at 36*l.* 10*s.* *per* ton, which was about the average price, and the whalebone at 90*l.*, and add to the amount 10,000*l.*, for the probable value of the skins, and other articles,—the gross value of goods imported into Britain from Greenland and Davis'

Straits in five years, free of first cost, will appear to have been near three millions Sterling.

The greatest cargo ever brought into Great Britain in one vessel from the whale-fishery, was procured near Spitzbergen, by Captain Souter in the Resolution of Peterhead, in the year 1814. It consisted of 44 whales, which produced 299 tons of oil, value, reckoned at 32*l. per* ton, the average price that year, 9568*l.*; if to this we add the value of the whalebone and the bounty, the gross freight of this ship will appear to have been near 11,000*l.* Other ships, however, with less cargoes, have made still greater freights, particularly in 1813, when oil sold for near 60*l. per* ton. In this year, the John of Greenock, commanded by my father, made above 11,000*l.* freight; and the cargo of the Esk of Whitby, commanded by myself, sold for near the same sum. The Augusta of Hull, Captain Beadland, procured a still greater cargo; and the Lady Jane of Newcastle, Captain Holmes, which brought home a larger cargo from the fishery that season than any other vessel, realized, I believe, the greatest profit ever made by one vessel in any one season, since the northern whale-fisheries were practised.

Among the ports of Britain which have been distinguished for speculating in the whale-fisheries, those of London and Hull seem to have been the most early engaged in the trade.

From LONDON, were generally equipped those vessels sent on discovery, which proved the immediate cause of the establishment of the Spitzbergen whale-fishery; and from the same place the first fishermen were sent out. The joint-stock companies, which, at different times, embarked their capitals in the trade, likewise sailed their ships from the Thames. Between the years 1780 and 1790, London sent above four times the number of ships to the northern whale-fisheries of any other port in Britain. In 1786, 87 ships sailed from the Thames for Greenland and Davis' Straits, and in 1788, 91. In 1810, the number of the London shipping employed in the trade was reduced to 15 sail; in 1811 it was 16; in 1814 it had increased to 20; the three following years it was 19, and the last year (1818), it was 18 sail. The success of the London fleet was below the general average, each of the last five years, excepting 1814.

The merchants of HULL were among the first to adventure their ships towards the frigid regions of the Pole, in pursuit of the whale. They were whale-fishers on the coasts of Norway and Iceland, before the discovery of Spitzbergen by the English; and if they were not the first whale-fishers at Spitzbergen, they were at least on its coasts looking for sea-horses, in the very year in which the Russia Company first attempted the capture of the mysticetus. On this occasion, they were so happy as to be the

means of saving the crews of two London ships, both of which were wrecked. The Island of Jan Mayen was, on the part of the British, the discovery of the Hull fishers, and when their right to sail to the whale-fishery was disputed by the Russia Company, on application to Government by the corporation, this island was granted them for a fishing station.

The Hull whalers have generally been conspicuous for their success in their occupation; and, of late years, for the number of their shipping.

In 1786, 18 vessels sailed from this port to the whale-fisheries; and in the year following the number was more than double. In the latter year (1787,) the tonnage of the 31 ships belonging Hull, amounted to 8160 tons; one of the fleet was lost, and the other 30 caught 110½ whales, and 7941 seals, which produced 3583 butts of blubber, and 57¾ tons of whalebone. In 1788, the Hull ships sent to the Greenland fishery, were 29 sail, besides 7 to Davis' Straits: the whole caught 121 whales, 2997 seals, 19 bears, and 4 narwhales, producing together 2938 butts of blubber, and 46 tons 10 cwt. of whalebone. Two years afterwards, the success of the Hull ships was much greater, 17 of their fleet having taken 125 whales and 12,640 seals, which produced 1678 tons of oil, and 80½ tons of whalebone. In 1799, the Hull fleet was particularly successful; and in 1804, 24 Greenland ships and

16 Davis' Straits ships, procured a total of 397 whales, 23,659 seals, and 51 narwhales, which produced nearly 4000 tons of oil, and 150 tons of whalebone. The increase in the Hull whale-fishing concerns, has of late been very remarkable. In 1810, 34 ships sailed from thence to the northern fisheries; in 1811, 43; in 1812, 49; in 1813, 55; in 1814, 58; and in 1818, 64.

The amount of produce of the Hull shipping, during the four years ending with 1817, was in whales, 1785; and the quantity of oil obtained from their cargoes, 20,891 tons; the average *per* ship each voyage, was 91 tons of oil, being about 2 tons less than the general average of the British northern fisheries.

The greatest cargo ever brought into Hull from Greenland, was procured by Captain Sadler in the Aurora; and the greatest cargo from Davis' Straits by Captain Marshall in the Samuels, in the year 1808: the cargo of the Aurora produced 267 tons of oil, and that of the Samuels 275 *.

Among the English ports, those of Whitby, Newcastle, and Liverpool, rank next in importance to Hull, in point of shipping interest in the whale-fishery.

WHITBY first sent out ships on the Greenland fishery in the year 1753. The two ships which

* Captain Bennet, *Letter.*

were at this time fitted out, proving tolerably successful, two others were sent along with them each of the three following years. In 1757–8, four ships sailed to the fishery; in 1759 none; in 1760, one; and from 1761 to 1766, during the war, when the transport service was more profitable, the whale trade from Whitby was suspended. Mr Banks, one of the captains, after the revival of the trade, brought home 65 fish, most of them sizeable, in 10 years *. This success of 6½ fish *per* voyage, was at this time considered as a very great average.

In the year 1777, only 9 ships sailed from the different ports of Britain to the whale-fishery of Davis' Straits, 6 of which were from Whitby: one of these caught 8 fish, yielding 117½ tons of oil, and the other 5 were likewise successful. Twenty ships were equipped from this port in 1786, and the same number the two following years. Their success in 1786, was 86 size †, and 12 small fish; in 1787, 53 size, and 8 small fish, together with 3048 seals; and in 1788, 45 size, and 11 small fish. After this period, the Whitby fleet decreased in number until 1795, when only four ships were fitted out, and it has since been usually fluctuating between 4 and 12 sail.

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* Charleton's History of Whitby.

† A whale is called *size*, when the longest lamina of its whalebone measures six feet (in some ports seven,) or upwards, in length.

In the "History of Whitby," by the Rev. G. Young, we have some interesting notices respecting the whale-fishery of this port. The author informs us, that the number of different vessels that have been employed from Whitby in this trade, from first to last, that is, from 1753 to 1817 inclusive, is 53. "Of this number 8 have been lost in the Greenland seas, and one burnt in the harbour, when ready to proceed on her voyage."—"The most disastrous year that has occurred was 1790, when two ships were lost, and the rest indifferently fished." In 1792, out of seven ships that sailed to the fishery, one was lost, four returned home *clean*, and the other two had but one fish each." The first shipwreck took place in 1771, the last in 1792*. Hence we find, that since that period to the present, though 178 ships have sailed from Whitby to the fishery, including repeated voyages, no loss has happened. "The most successful years were 1811 and 1814: in the former, 7 ships brought home 171 whales, producing 1181 tons of oil, and 35 tons of fins; in the latter, 8 ships brought 172 whales, producing 1390 tons of oil, and 42 tons of fins†. The number of ships dispatched from Whitby to Greenland and Davis' Straits, including repeated voyages, in the space of

* Young's History of Whitby, p. 565. † Id. p. 566.

52 years, comprised between 1767 and 1818, inclusive, was 460 sail, and their cargoes amounted to 2921 whales, (an average of $6\frac{1}{3}$ *per* ship), besides a great number of seals, bears, narwhales, and sea-horses. Of this number of whales, considerably above half have been taken by five ships now in the trade, of which ships, it may be remarked, that three of them have performed 124 voyages to the whale-fishery, without having missed a single season since they commenced *. "In ten successive voyages, the Resolution," (commanded eight years by my Father †, and two by myself), "obtained no less than 249 whales, yielding 2034 tons of oil; and the Henrietta, Kearsley, brought home, in ten voyages, ending with 1816, 213 whales, producing 1561 tons of oil ‡." In the last 23 years, the Whitby fleet, averaging $7\frac{10}{23}$ ships *per* year, have procured 1879 whales, which yielded 17,643 tons of oil: and, in the last fourteen years, 116 ships, reckoning repeated voyages, have

* The Volunteer has been 47 voyages; the Henrietta 43; and the Lively 34; besides their voyages in the present year 1819.

† My Father, in 28 voyages, in which he has commanded a ship on the fishery, has brought home 498 whales; producing 4246 tons of oil; value, including whalebone, above 150,000*l.* all fished for, under his own direction, out of the sea!

‡ Young's Hist. of Whitby, p. 567.

procured a greater number of fish, than *four times* the number of vessels did, which sailed to the fishery, in a former period of 38 years. This fact is a striking illustration of the improvement in the talent exercised by the fishers of the present day. On an average of five years, ending with 1818, the Whitby whalers have procured 103½ tons of oil *per* ship each voyage, being 11 tons more *per* ship each voyage, than the general average of the northern fishing during the same period.

Instead of going through with the comparative view of the fishery of the different ports, which would be too tedious to be interesting, I shall conclude this account of the whale-fishery by the British, with a Table, showing the relative success of the ships fitted out of different ports, during the four years, ending with 1817.

TABLE.

British Ports Engaged in the Whale-fishery.	Number of Ships.			Amount of Cargoes Obtained.			Average Cargo *per* Ship each Year.		
	Equipped in Four Years.	Average *per* Year.	Lost in Four Years.	Number of Whales.	Tons of Oil.	Tons of Whale-bone.	Number of Whales.	Tons of Oil.	Tons of Whale-bone.
London,	77	19¼	2	775	6,631	346	10.1	86.1	4.5
Hull,	229	57¼	3	1785	20,891	1064	7.8	91.2	4.6
Whitby,	39	9¾	0	433	4,181	201	11.1	107.2	5.2
Newcastle,	23	5¾	1	164	2,295	108	7.1	99.8	4.7
Other English Ports,	24	6	1	191	1,826	87	8.0	76.1	3.6
Total from England,	392	98	7	3348	35,824	1806	8.5	91.4	4.6
Aberdeen,	55	13¾	0	427	4,618	225	7.8	84.0	4.1
Leith,	40	10	0	278	3,756	170	7.0	93.9	4.2
Peterhead,	33	8¼	0	402	3,815	187	12.2	115.6	5.7
Dundee,	32	8	0	248	3,496	159	7.7	109.2	5.0
Montrose,	15	3¾	0	127	1,169	62	8.5	78.0	4.1
Other Ports in Scotland,	19	4¾	1	200	1,830	88	10.5	96.3	4.6
Total from Scotland,	194	48½	1	1682	18,684	891	8.7	96.3	4.6
Total from Britain,	586	146½	8	5030	54,508	2697	8.6	93.0	4.6

The people of IRELAND have never been distinguished for any particular exertion in the whale-fishery. I have scarcely, indeed, met with a notice of any ships from this part of the United Kingdom, having been dispatched to Greenland or Davis' Straits; though the British Parliament has, at different periods, encouraged the Irish to embark in the fishery, by offering them bounties, and putting them on an equal footing with the British adventurers. Some attempts, however, have been made, for prosecuting the whale-fishery on the Irish coast, and occasionally, with a considerable degree of success,

A Lieutenant in the Army, of the name of Chaplain, who, during the early part of his life, had been employed in the Greenland fishery, first tried the whale-fishery on the Irish coast. He had received intimation from a brother officer, when abroad, that many whales resorted to the north-west coast of Ireland in the spring of the year; on which, being an enterprising man, he sold his commission and repaired to Ireland. Having procured two boats suitable for the whale-fishery, together with the necessary supply of harpoons and other instruments, he commenced his fishing occupation, but was able to kill only two whales in eight years. As the whales were numerous on the coast, Chaplain imputed his want of success to his imperfect apparatus, and being unable to purchase

what was needful, he applied to the Irish Parliament for aid, and obtained a grant of 500*l.*; but dying soon after, it was never paid. His brother then pursued the project, but with no better success.

In 1759, two enterprising gentlemen, who lived on the sea-coast of the county of Donegal, revived Chaplain's undertaking. But though they procured all the necessary assistance from persons experienced in the Greenland fishery, together with a well adapted vessel, fully equipped with boats and other apparatus; and though numbers of whales were seen, both when they made their first attempt in 1760, and in the year following, yet they were unable to take more than one during the two first seasons in which they persevered in the pursuit. After having expended 3000*l.* in the undertaking, they discovered, that the whale which resorted to these seas, being of different habits from the Greenland whale, could not be taken in the same way. Mr Nesbet, therefore, one of the speculators, made a trial with the harpoon-gun, and fired both harpoons and lances at the whales, and with such success, that they killed three fish in 1762, two of which were between 60 and 70 feet in length, and the other above 50; and in the year following, they also killed two whales of a large size, which was more than many of the ships, fitted for Greenland at a vast expence, obtained. The same year (1763), the Irish

Parliament granted 1500 *l.* to Messrs Nesbet, to encourage them in this national undertaking*.

SECT. II.

Whale-Fishery of the British Colonies in America.

WHILE the subjects of Great Britain pursued the whale-fishery at Spitzbergen to a considerable extent, and with various success, and while they performed a voyage so distant, and practised the arduous operations of the fishery in the Polar regions,—the colonists in America had the advantage of conducting the fishery more immediately at home. Hence we find many notices of their successful labours in this speculation. Their fishery in 1730 was prosperous, and in 1731, we learn that the New Englanders employed 1300 tons of shipping in the trade †.

Anderson, in his History of Commerce, mentions, that after the coasts of the Gulf and River St Lawrence fell into the hands of the British, by

* Scots Mag. vol. xxx. p. 510,–511. According to Macpherson, the sum granted by the Irish Parliament for the encouragement of the fishery, was 1000*l.*

† Macpherson's Annals of Commerce. A. D. 1730,–1.

the reduction of Quebec, the capture of whales, seals and morses, in this quarter by British subjects, soon exceeded in extent any former fishery carried on by the French *. The increase in the whale-fishery of the New Englanders, at this period, was very rapid. In 1761 they employed 10 vessels of about 100 tons burden each; 50 in 1762, and above 80 in 1763; in consequence of which, such an increase in the importation of whalebone into Britain took place, as reduced the price of that article from 500*l.* to 350*l.* *per* ton †. For the encouragement of this fishery, the fins and oil of whales caught in the River St Lawrence and on the coasts of British America, were allowed to be imported into Britain, on payment only of the "old subsidy," directed by act 25th Car. II. c. 7, ‡, of 6*s.* *per* ton on oil, and 50*s.* *per* ton on fins §. This encouragement, added to local circumstances, which were convenient, had such an effect, that in 1767, (three years afterwards), the American colonists employed about 300 vessels, estimated at 60 tons, and 13 men each, in the whale-fishery about the coasts of Newfoundland, Labrador, and the Gulf of St Lawrence. In the Gulf only, they killed 100 of the best whales in about six weeks, and their success on other sta-

* Ander. Com. A. D. 1763.; and Scots Mag. vol. xxvi. p. 160.

† Anderson, A. D. 1763. ‡ 4th Geo. III. c. 29.

§ *Fins*, as referring to the whale, is a term used in our acts of Parliament, in place of whale-bone.

tions was likewise considerable *. In 1770, there were imported into England from the British American colonies, including Newfoundland, &c. 5202 tons of whale-oil, and 112,971 pounds weight of whale fins; and into Ireland from the same colonies, 22 tons of whale-oil †.

The act permitting the importation of whalebone, &c. of American fishing into Britain, was continued in 1771 until the 25th December 1786, in vessels navigated according to law, and subject to no other impost but that called the Old Subsidy ‡. The ships of the colonists, if not more than two years old, were, by the same act, entitled to bounties on their tonnage similar to the British shipping, provided they proceeded, after due inspection, from their ports in America before the 1st of May, for the Greenland seas, and returned from thence to some port in Britain with the produce of their fishery.

The American whale-fishery, at this period, was carried on by boats of about six men, and in a great measure by the Esquimaux Indians, from whom the colonists were in the habit of purchasing oil and fins. The oil and fins of the Esquimaux fishing, are stated to have been much inferior to those brought from Greenland; the oil being adulte-

* Anderson's Com. A. D. 1767. † Idem, A. D. 1775.

‡ 11th Geo. III. c. 38.

rated with a mixture of seal and cod oil, and the fins brittle *.

"In order to encourage that great nursery for hardy seamen, the Newfoundland fishery," Parliament, in the year 1775, offered premiums to successful fishers, as well whale-fishers as others. The vessels were to be "British built, of 50 tons burden or upwards, belonging to Great Britain, Ireland," or places subject to the British Crown, and navigated with not less than 15 men, three-fourths of them, besides the master, being British subjects. Vessels thus conditioned, "prosecuting the whale-fishery in the Gulf of St Lawrence, or on the coasts of Labrador or Newfoundland, and catching one whale at least, were allowed to import their oil free of duty; and premiums of 500*l.*, 400*l.*, 300*l.*, 200*l.*, and 100*l.*, were allowed to the five vessels which should bring the greatest quantity of oil. The skins of seals, caught by European British subjects, were also admitted to be imported free of duty, in ships legally navigated †."

In 1780, the British colonies afforded to Ireland 24,489 gallons of oil, of their own fishing; in 1781, 16,466 gallons; in 1782, 22,998 gallons; in 1783, 43,743 gallons, and in 1784, 30,985 gallons of oil ‡. The same colonies imported into Britain, in 1787,

* Anderson's Com. A. D. 1771. † 15th Geo. III. c. 31.

‡ Macpherson's Annals of Commerce.

3447 *tons* of oil *. And in 1794, there were imported into Britain from the United States, 970,628 gallons of oil; in 1795, 810,524 gallons, and in 1796, 1,176,650 gallons of whale oil.

At the present time, the whale-fishery of the Gulf of St Lawrence is conducted by the inhabitants of Gaspie and others, inhabiting the shores of the gulf and river. They seldom meet with the mysticetus, but usually attack a species of fin-whale, which resorts periodically to their coasts.

SECT. III.

Whale-Fishery of the Dutch.

THE Dutch have been eminently distinguished, for the vigour and success with which, for the space of more than a century, they prosecuted the whale-fishery at Spitzbergen. But though this branch of their commerce was so generally successful during such a long period, it was by no means equally profitable at all times, from its commencement in the beginning of the seventeenth century, to its termination near the end of the eighteenth century. On the contrary, there were occasional periods of general loss to the adventurers.

* Oddy's European Commerce, p. 533.

Hence, the whale-fishery of the Dutch is divisible into several eras, distinguished by some change of national character, or by their economy or lavishness in the equipment of their vessels; to which circumstances, the difference in the degree of success that resulted from their labours in the different eras, is to be attributed.

They first entered the fishing stations on the coast of Spitzbergen with one ship, fitted for taking whales, and another for hunting sea-horses, in the year 1612. But on this, as well as on future occasions, they were prevented by the English Russia Company's ships from enjoying to the full, the several advantages which the fishery was capable of affording.

As the Dutch, as well as the English, afterwards sent armed fleets to the fishery, the quarrels became, occasionally, of a serious nature; but after a few years of hostility, the folly of conflicts, productive only of mutual injury, became glaring. A plan was therefore arranged, for preventing their interference with one another in the fishery, by making a division among the different nations, of the bays and harbours, suitable for fishing stations, in Spitzbergen. When this measure had, in a considerable degree, adjusted the existing differences, the Dutch took possession of their portion of bays and harbours, and built boiling-houses, warehouses, cooperages, and other erections convenient for the

purposes of the fishery, and for reducing the blubber into oil. These buildings were principally made at the expence of the joint-stock companies, which were at different periods chartered by the States-General, prior to the year 1642, the period when the trade was laid entirely open to all adventurers*. The principal edifices of the Dutch were raised on Amsterdam Island; where the rapid increase of the shipping employed in the fishery, their universal good success, and the expectation that the trade would never fail, induced them to extend their buildings in such a degree, that the place became of considerable importance, and was characteristicly designated Smeerenberg. During the first twenty or

* 1*st* Charter for 3 years, bears date 27th January 1614, (Beschryving, vol. i. p. 3,–4.); extended in 1617 for 4 years; and in 1621 for 1 year: 2*d*, The charter of the Zealand Company, allowing them to participate in the trade, bears date 28th May 1622, (Id. vol. i. p. 9.): 3*d*, The charter of "the Greater and Lesser Northern Societies of Holland," for 12 years, bears date 22d December 1622, (Id. vol. i. p. 6,–8.): 4*th*, The Frieslanders' charter for 20 years, bears date 22d November 1634, (Id. vol. i. p. 10,–12.): 5*th*, The charter of the North Holland and Zealand Companies, united with that of West Friesland for 8 years, bears date 25th October 1633, (Id. vol. i p. 18,–20.) This charter expired in 1641, and was not afterwards renewed: 6*th*, The Frieslanders joined, by agreement, with the Companies of Zealand and Holland, to be partakers of the benefit of their charter for 8 years: this agreement consists of 24 articles, and bears date 23d June 1636, (Id. vol. i. p. 13,–16.)

thirty years, the Dutch fishery maintained its importance, and was prosecuted with the most splendid success. The ships that were on the fishery, being sometimes incapable of carrying home the extraordinary quantity of oil and fins which they obtained, empty vessels were occasionally sent out for taking in the superabundant produce *.

After prosperity had invariably crowned their endeavours for a number of years, the whales at length appearing to have become sensible of the danger to which they were exposed from the fishers, commenced their retreat from the bays, and were afterwards discovered with less certainty, and consequently captured in fewer numbers. This circumstance marks the termination of the *first* era.

The system of extravagance which had been adopted in times of prosperity, continued to be acted upon during the *second* era of the Dutch fishery. Heavy losses, arising from the expensive nature of all their buildings, which, in the final retreat of the whales from the bays, became progressively of less importance, the extravagant equipment of their ships, and the increased expence required for adapting the ships for the sea-fishery, together with the growing scarcity of the whales, at length obliged the chartered companies to adopt

* Elking's View, &c. p. 43.

measures of retrenchment, since their former profits, abundant as they undoubtedly had been, were in a great measure swallowed up by subsequent losses. Presuming, it seems, on their former success, they neglected to adapt their expenditure to the then altered and particular state of the fishery. This period of general loss, consisting only of a few years, is comprised in the second era *.

The *third* era of the Dutch fishery, is distinguished by the adoption of that system of frugality, through which, in combination with the exercise of natural talent, they were enabled to prosecute the fishery with a splendour and advantage, which excited the admiration of all the commercial nations of Europe. The chief improvements and peculiarities in the new system are said to have consisted of two measures.

First, The number of men and quantity of stores required for ships of different dimensions, were adjusted with careful minuteness, whereby prior redundancies were detected and discontinued.

Second, The trades-people supplied the ships with stores on the principle of bottomry †; that is, the baker, brewer, sailmaker, ropemaker, cooper, and

* Forster, in his History of Voyages and Discoveries in the North, mentions that the fishery was in the fulness of its splendour, from 1614 to 1641, (p. 426.) And B. de Reste, in the "Histoire des Pêches," observes, that it was in its most flourishing state about the year 1630, (tom. i. p. 276.)

† Macpherson's Annals of Commerce, vol. iii. p. 198.

other artificers, agreed to venture their stores on the success of the voyage; so that, in the event of a *clean* ship, they lost the whole or greater part; but in case of a full cargo being obtained, they probably received above twice the value of the articles furnished. Thus, when the fishery failed, the loss to the proprietors or freighters of the vessels was trifling, though it is very evident, that, in the event of great success, their emoluments were less considerable.

This fishing which enriched the adventurers by its ample produce, occasioned no small degree of activity in the village of Smeerenberg, and in the Island of Amsterdam in general. Such, indeed, was the bustle produced by the yearly visitation of two or three hundred vessels, containing from 12,000 to 18,000 men, being double manned *, that the place had the appearance of a commercial or manufacturing town; and of such consideration was this village, that the incitement of an advantageous traffic, drew a number of annual settlers to the place, for the purpose of vending such stores as brandy, wine, tobacco, and other commodities in constant demand,—to whom the exposure to cold, and the inconveniencies of the voyage, were amply compensated by the considerable profits which they derived. Not only shopkeepers, but bakers and

* Beschryving der Walvisvangst, vol. i. p. 28.

other artizans, resorted thither. With the bakers, it was customary to signify to the sailors, by the blowing of a horn, the time when the bread was just drawn hot from the oven *. Thus the vast fleets of ships which crowded into the harbour when the fishery without was suspended, in consequence of storms, thick weather, or any other circumstance †, occasioned the naturally barren and desolate shores of Spitzbergen, to assume the appearance of a populous country. And such was the flourishing appearance of Smeerenberg, that it was compared by the Hollanders with their famous settlement of Batavia, which was founded about the same time.

During the time the fishery was confined to the Dutch-chartered companies, the number of ships employed in it did not exceed 30 sail on an average; but in a few years, after it was laid entirely open, the annual voyagers from Holland were increased tenfold; and it is surprising, that the success of the ships, notwithstanding the num-

* Beschryving der Walvisvangst, vol. i. p. 28.

† After the boiling-houses at Smeerenberg were disused, the place continued to be a general rendezvous for such ships as had made a successful fishing; to which they retired for the convenience of packing the blubber in their casks. This, together with the above-mentioned purposes for which it was also visited, rendered the bay and harbour at all times crowded with ships, during the continuance of the fishing season.

ber which crowded into the trade for many years, was very considerable.

Great as the importance of Smeerenberg had hitherto been, it gradually declined, as the fish retreated to a greater distance from the bays, and the mode of capture was changed. The blubber being then taken home in its raw state, the boiling-houses first became useless, the coppers were afterwards taken up, and many of the buildings wantonly dilapidated. As the place became still less frequently the resort of the fishers, the huts and warehouses, many of which had been built at great expence, progressively shared the same fate. Such as were spared by the wanton hand of mischief, at length yielded to the silent but certain operations of time, and fell into a state of decay.

This era, comprising an interval of about 130 years, is one of the greatest importance in the annals of the Dutch commerce. During this extensive period, the Dutch whale-fishery probably averaged 160 sail annually; which fleet but rarely failed to return a very handsome profit to its owners, was consequently a general benefit to the people immediately interested in its success, and a universal source of national wealth during the whole epoch.

The *fourth* era of the Dutch whale-fishery, is marked by an apparent change in the national character, and by an evident change in the commercial abilities of the people. From being one of the

most enterprising and intrepid nations in the world, they, through the dissolution of their unanimity, by the presence and influence of French soldiery, and the consequent introduction of French principles among them, have greatly degenerated in public spirit and commercial talent. Hence, of late years, their energies have been relaxed, and they have been unable to keep pace with the improvements which have been adopted in the art of the fishery by the British, and their success has in consequence been much inferior. Such is the revolution which has occurred in the fishery of the Dutch, that their antient superiority over the British is now reversed;—the British, in point of fishing talent, being, at present, beyond dispute their superiors: And as the English in the early and middle ages of the whale-fishery, were commonly under the necessity of engaging the assistance of the Dutch, so the Dutch now, in their turn, find British fishing-officers a valuable acquisition. About the year 1770, the Dutch fishery began to decline; during half a century previous to this period, it had averaged 182 ships *per* year, but from 1769 to 1778, the average was reduced to 134 sail, and about the time of the American war, to 60 or 70 ships *per* year *.

* Oddy's Commerce, p. 525.; and Histoire des Pêches, vol. i. p. 294 to 316.

The Dutch, it may be remarked, have been more assiduous adventurers in the northern whale-fisheries than any other nation, having pursued the trade at all times since their commencement in the year 1612 to the present, except when the peculiar situation of the country with regard to other nations, prevented their ships from visiting the fishery; and even then, in times of war, they often ventured abroad under the disguise of a neutral flag. Partial or total suspensions of their whale-fishery were thus occasioned in the years 1653, 1659 (conditionally), 1665, 1666, 1672, 1673, 1674, 1691, 1781, 1782, and during the last war. Excluding these occasions, when the fishery was intercepted, the Dutch whale-fishery, during a period of 125 years, included between 1660 and 1795, employed 18,992 vessels, which captured 71,900 whales; averaging 152 ships and 575¼ fish, or 3¾ fish *per* ship each year.

The Dutch Government has at all periods, since the discovery of the whale-fishery, encouraged its prosecution by various edicts of indulgence, but never by bounties, until the year 1815, when a premium of 4000*f.* (to be continued for three years) was offered on the outfit of every ship, and 5000*f.* more if she returned home clean. If she met with success, 50*f.* were to be deducted off the second bounty for every quardeel or barrel of oil she brought home, thus absorbing all the second bounty, if her

cargo should produce 100 quardeelen of oil or upwards. Previous to this, the encouragements held forth were principally comprised in the exemption of all the produce of the whale-fisheries, together with some of the stores used in the equipment of the ships, from duty. The Government, at the same time that it encouraged its own subjects to embark in this trade, for the benefit of the State, was exceedingly careful that none of the advantages accruing from it should be divided with other nations. The means used for confining the prosecution of the whale-fishery, by the subjects of the United Provinces, within their own dominions, were extremely rigorous. No ship was allowed to be equipped for the whale-fishery by Dutch subjects, from any country or kingdom but their own; and no barrels, boats, or other implements used in the fishery, were permitted to be exported or sold abroad, under the severest penalties: no ship was allowed to be fitted in Holland for the use of any foreign power, under the penalties of its confiscation, &c.: none of the produce of the whale-fishery was allowed to be conveyed from Greenland to any foreign country to be disposed of, directly or indirectly, (excepting under the usual regulations of exportation), under the penalty of 6000 florins, security for which sum was required for each ship before putting to sea, together with the confiscation of the ships by which such produce might be ille-

gally conveyed abroad: and no harpooner, boat-steerer, or other fishing-officer, was allowed to engage in the service of any foreign nation, in time of war, under severe restrictions*.

The great fishery of the north has not always answered the expectations of the adventurers; it is admitted, on the contrary, that in many disastrous years, the products were greatly inferior to the expences. A thousand unforeseen accidents occasionally disappointed the vigilance of the directors of the different companies and societies of whale-fishers, and rendered the labours of the seamen, whose department it was to capture the whales, ineffectual.

Some speculators have imagined, that the fishery for the whale was, on an average, disadvantageous, and that, on the whole, it was injurious rather than beneficial to the State. Others have compared this branch of commerce to a lottery, in which, while some obtain large prizes, others suffer still greater loss; and, consequently, as in a lottery, there must be an ultimate loss to the speculators. These opinions seem, however, to be grounded in error, since, from different careful calculations, it appears, that between the years 1669 and 1778, the Dutch whale-fishery was a general source of gain to the ad-

* The greater part of these regulations were in force only in time of war.

venturers, and of riches to the State. The national benefit, it is true, has always been diminished by part of the money expended in stores for the equipment of the fishing ships, being paid to strangers for foreign produce; but the greater proportion of the expenditure reverted to the benefit of the State, by being paid for articles which were the produce of the country, and for wages to various artificers and labourers, who procured an ample livelihood in manufacturing the foreign produce into stores proper for the outfit of the fleet.

Zorgdrager, whose authority is highly respected by his countrymen, estimates the expence of fitting a ship with six boats and all other stores requisite for the whale-fishery, at 4924 florins 17 sols. His calculation is as follows:

For casks, - -	2370*f*	
Boats and all other stores, -	2554	
		4924*f*.
Wages of 42 men for the voyage, -		3000
Hire of the ship and insurance, -		3000
Provisions for the voyage, -		1523
Sum total of *advances* for a whale-fishing ship, - - -		12447*

* Histoire des Pèches, vol. i. p. 279. This estimation being made for a hired ship, might be expected to admit of the deduction of the owner's profits, when the calculation is applied to such ships as are the property of the adventurers.

Thus, an expence of 10,000 to 13,000 florins was requisite, before a ship could be sent out and return from the fishery; and this sum was necessarily expended whatever might be the issue of the voyage. This estimation does not differ greatly from that of other intelligent persons. A work, entitled "Den Koopman," (The Merchant,) states the average number of fishing ships to have been 180 sail, the amount of advances on which, after the rate of Zorgdrager's estimation, is 2,240,460 florins. Wagenaar, another celebrated historian of Holland, gives a calculation a little different. He estimates the total advances requisite for the equipment of 180 fishing ships, at 1,800,000*f.* after the rate of 10,000*f.* for each ship. We find the particulars of Wagenaar's calculation in his work, called "Tegenwordigen Staat der Vereenigde Nederlanden." They are as follow:

36,000 new casks,	108,000*f.*
2,700,000 hoops, for repairing old casks, &c.	43,200
Coopers' wages,	21,600,
172,000 lb. of cordage,	35,000
Making and repairing boats, with their stores,	15,000
Iron-work, nails, smiths' wages, &c.,	5,000
400,000 lb. of beef, &c.,	40,000
2,800 firkins of butter, of 80 or 90 Amst. lb. each,	57,600
150,000 lb. of stock-fish,	12,000
550,000 lb. of biscuit,	40,000
72,000 lb. of soft bread,	18,000
Carried forward,	395,500*f.*

Brought forward,	395,500 *f.*
550 ankers of geneva,	5,500
Sugar, spices, &c.,	3,000
60,000 lb. of Friesland pork,	8,000
144,000 lb. of cheese,	18,000
20,000 lb. of Texel and Leyden cheese,	1,500
10,800 barrels of beer, (including excise duty,)	27,000
9,000 sacks of pease, barley, &c. &c.,	40,500
Herrings and salt-fish,	3,000
Various cook's and cabin furniture; expences of transporting stores on board, &c.,	38,000
Hand-money to seamen,	180,000
Wages of seamen, payable on the return of the ships, and other incidental expences during the voyage,	540,000
For the freight or hire of the ships, at the rate of 3000 florins for each ship,	540,000
Sum total of *advances* for 180 whale-fishing ships,	1,800,000 *f.*

The difference in the calculations of Zorgdrager and Wagenaar, is 440,460 florins on the total, and 2447 florins for each ship. Wagenaar's estimation is, therefore, about one-fifth less than that of Zorgdrager.

Hence, the total amount of money expended annually by the Dutch in the prosecution of the whale-fishery, (exclusive of the additional expences resulting from success in the fishery,) seems to have been 1,800,000 to 2,240,460 florins; and however

disastrous the fishery might be, this sum was always to be paid. But though it might have happened, that this sum was on any occasion totally lost to the adventurers, yet the final loss to the State was not great, because that proportion of expences only which was required for foreign labour and foreign produce, was considered as subtracted from the national wealth.

As it would be too elaborate and uninteresting, were I to follow the foreign authors in the whole particulars of their estimation of the national loss which accrued from one year's equipment of 180 ships, supposing no returns from the fishery, I shall content myself with giving the result of the whole; and to those who wish for further information on the subject, refer them to the originals*. The Dutch authors divide the preceding table of Wagenaar's in the following manner:

1. They extract the value of certain articles which are the produce of the Provinces, such as butter, cheese, beef, bacon, pease, oatmeal, &c. to which they add the wages of coopers and other artificers, the money expended in which remains entirely in the country, and amounts to ..... 233,500 *f.*

* "Nieuwe Beschryving der Walvisvangst en Haring Visschery, door D. de Jong, H. Kobel, en M. Salieth." And its French translation, "Histoire des Pêches, des dêcouvertes, et des etablissemens des Hollandois, dans les Mers du Nord, par le C. Bernarde de Reste."

Brought forward, 233,500 *f.*

. The value of articles of foreign produce, or any of the ingredients of which are imported from foreign countries, consisting of barrel staves, stock-fish, bread, beer, geneva, timber, iron, hemp, &c. amounts to ... 306,500 *f.*

Of this sum, the proportion which is paid to foreign powers for the raw materials, &c. is estimated at.....217,600

And the difference of these sums, which is entirely expended in the wages of artificers, labourers, &c. remains in the country, ...88,900 *f.*

3. Amount of seamens wages, ...720,000

Of this sum, a part is carried abroad by the few foreigners who are engaged from neighbouring states, estimated at.....20,000

Therefore, the difference of the two sums remains in the country, which is, ... 700,000

4. All the money paid for the freight or hire and insurance of the fleet remains in the country, which, as before stated, amounts to 540,000

Hence, the proportion of the advances of 180 fishing ships, which remains in the country, is estimated at.....1,562,400

And the proportion paid to foreign countries, only..... 237,600 *.

* This sum should be increased, and the former sum diminished, by the value of losses among the shipping, which, averaging 3.73 ships *per* year, makes 37,300 *f.*

The Dutch authors therefore conclude, that should it ever have so happened, that the whole fleet of 180 ships should have returned home without a single fish, the adventurers would, in fact, lose the sum of 1,800,000 florins; but so far from this sum being lost to the State, the equipment of the Greenland fleet, notwithstanding the total failure of the fishery, would augment the interior circulation of money, in the amount of the above enumeration of 1,562,400*f*; and the amount of loss to the State, in this point of view, would only consist of that proportion of the total advances paid to foreign nations for hemp, tar, masts, timber, staves, iron, and other articles, which is calculated at 237,600 florins.

M. Gerard Van Sante, published in 1770, "An Alphabetical List of the Captains of Fishing-ships sent to Greenland and Davis' Straits*;" which, notwithstanding the unpromising title, is in reality an instructive work. It is from it, indeed, that the most interesting details of the success of the Dutch fishery during a period of more than a century, included between 1669 and 1779, are derived. While the whale-fishery opened to the inhabitants of Holland a new branch of commerce, it, at the same time, conferred two important advantages on the State; the first and the most general was, that it

* "Alphabetische Naamlyst van alle Groenlandsche en Straat Davische Commandeurs."

afforded a useful employment to a vast number of labourers and artificers, and it gave to the interior trade a new circulation and increased activity; and the second was, that while it conferred an actual benefit on the adventurers, and through them on the State, it likewise occasioned an improvement in the general relations of commerce with foreign powers.

For estimating, as nearly as may be, the amount of the emoluments derived from the whale-fishery, by the individuals speculating in the trade, during the period detailed by Gerard van Sante, it may be divided into eleven equal portions of ten consecutive years, each of which, in the "Nieuwe Beschryving der Walvisvangst," and in the "Histoire des Pêches," forms a distinct table; but for the sake of brevity, I shall include the whole in one point of view.

TABULAR VIEW, &c.

To Face page 156. vol. II.]

TABULAR VIEW of the Dutch Greenland Fishery, During a Period of One Hundred and Seven Years.

Years Inclusive.	No. of Ships sent out.	Expences of Equipment of ships: or advances.	Ships Lost.	Value of the Ships Lost.	Expences of Preparing the oil and fins, with other Incidentals.	Amount of Expences.	Profit or Balance in favour of the Adventurers.	No. of Whales taken.	Casks or *Vates* of Blubber.	Barrels per Quandelen of Oil.	Price of Oil per Q.	Value of Oil in Florins.	Quantity of Whalebone in Pounds.	Price of Fins per 100 lb.	Value of the Fins in Florins.	Amount of Receipts.
1669–1678*	991	2,930,000	85	850,000	4,250,000	13,010,000	4,283,000	6,414	283,386	425,000	31	13,175,000	12,750,000	48	6,120,000	19,295,000
1679—1688	1932	18,320,000	113	1,130,000	5,900,000	26,350,000	908,000	10,019	395,771	590,000	36	21,240,000	17,700,000	34	6,018,000	27,258,000
1689—1698	955	9,550,000	82	820,000	2,836,000	13,206,000	10,928,360	4,864	189,132	283,600	50	14,180,000	8,508,000	117	9,954,360	24,134,360
1699—1708	1652	16,520,000	62	620,000	4,518,000	21,658,000	4,727,120	8,537	301,250	451,800	41	18,523,800	13,554,000	58	7,861,320	26,385,120
1709—1718	1351	13,510,000	51	510,000	2,557,000	16,577,000	6,129,160	4,645	170,488	255,700	57	14,574,900	7,671,000	106	8,131,260	22,706,160
1719—1728	1504	15,040,000	40	400,000	1,874,000	17,414,000	588,880	3,439	131,607	197,400	42	8,290,800	5,922,000	164	9,712,080	18,002,880
1729—1738	838	8,380,000	13	130,000	1,304,000	10,014,000	3,427,680	2,188	86,939	130,400	39	5,070,600	3,912,000	214	8,371,680	13,441,680
1739—1748	1056	13,560,000	31	310,000	2,892,880	16,762,880	7,016,544	6,190	192,859	289,288	45	13,017,960	8,678,600	124	10,761,464	23,779,424
1749—1758	1339	13,390,000	30	300,000	2,024,120	15,714,120	2,219,510	4,770	135,725	202,412	52	10,525,424	6,072,360	122	7,408,206	17,933,630
1759—1768	1324	13,240,000	25	250,000	1,464,190	14,954,190	1,166,592	3,018	98,517	146,449	60	8,785,140	4,392,600	167	7,335,642	16,120,782
1769—1778	903	9,030,000	31	310,000	893,780	10,233,780	2,895,954	3,483	89,378	133,917	62	8,306,574	4,019,300	120	4,823,160	13,129,734
1669—1778	14167		561			177,893,970	44,292,800									222,186,770

TABULAR VIEW of the Dutch Davis' Straits Fishery, During a Period of Sixty Years.

Years Inclusive.	No. of Ships Equipped.	Expences of the Equipment of the Ships.	Ships Lost.	Value of the Ships Lost.	Expences of Preparing the Oil and Fins, &c.	Amount of Expences.	Profit or Balance in favour of the Adventurers.	No. of Whales taken.	Casks of Blubber.	Quandelen of Oil.	Price of Oil per Q.	Value of Oil in Florins.	Quantity of Whalebone in Pounds.	Price of Fins per 100 lb.	Value of Fins in Florins.	Amount of Receipts.
1719—1728	748	7,480,000	20	200,000	1,112,280	8,792,280	1,351,348	1,751	74,152	111,228	42	4,671,576	3,336,800	164	5,472,352	10,143,328
1729—1738	975	9,750,000	14	140,000	1,527,910	11,417,910	4,350,037	1,929	101,561	152,391	39	5,938,829	4,565,700	214	9,809,118	15,767,947
1739—1748	368	3,680,000	10	100,000	793,240	4,573,240	2,947,168	1,162	52,186	78,324	45	3,569,580	2,779,700	194	2,530,828	7,520,108
1749—1758	340	3,400,000	6	60,000	461,500	3,921,500	167,390	513	32,857	46,150	52	2,399,800	1,384,500	122	1,689,090	4,088,890
1759—1768	296	2,960,000	4	40,000	537,720	3,537,720	2,215,477	818	36,219	53,772	60	3,226,320	1,613,160	167	2,696,877	5,753,197
1769—1778	434	4,340,000	8	80,000	833,960	5,273,960	3,094,252	1,313	59,044	85,396	62	5,294,552	2,561,880	120	3,074,160	8,368,712
1719—1778	3161		62			37,516,610	14,125,872									51,642,082
		Additional Expences in the Davis' Straits Fishery, of 1000*f.* per ship, in consequence of the greater length of the voyage, - -				3,161,000	Of 3,161,000									
						40,677,810	10,964,872									

* This interval between 1669 and 1678, consists only of 7 voyages instead of 10, as, in the years 1672, 1673, and 1674, a French war prevented the prosecution of the fishery.

Note.—The annual amount of advances, col. 3., is calculated in this Table, according to Wagenaar, after the rate of 10,000*f.* per ship. Zorgdrager's estimation is 12,447 *f.* per ship (page 150.): but in this sum is included 1024 *f.* for the first cost of casks, boats, and other stores for the fishery, only a small part of which requires to be renewed every year. Hence, though the expences of a ship, on her first voyage, were really 12,000 to 13,000 *f.*; yet, on future voyages, it would be reduced by the value of that proportion of stores, not requiring annual renewal, to about the same as Wagenaar's estimation, or 10,000 *f.* per ship per annum.

From this table, it appears, that the expences incurred by the Dutch Greenland whale-fishers, in the course of 107 years, included between 1669 and 1778, (three years of war omitted), amounted to 177,893,970 *f.*; that the product of the fishery was in the same interval, 222,186,770 *f.*, which leaves a balance in favour of the fishers of 44,292,800 *f.* or 3,691,066 *l.* Sterling. If we divide the expences and profits by 107, the number of years included in the estimation, we find the annual expenditure must have been 1,662,560 *f.*, and the annual receipts 2,076,512 *f.*, and consequently the annual profits 413,952 *f.* But if an annual expenditure of 1,662,560 *f.* afford an annual profit of the sum of 413,952 *f.*, there must be an advantage realized to the adventurers of about 25 *per cent* *.

From the same table, we learn, that during a period of 60 consecutive years, from 1719 to 1778, the Dutch Davis' Straits fishers realized a profit of 10,964,872 *f.* or 182,748 *f. per annum.* But the expences during this period being 40,677,610 *f.*, the proportional advantage to the adventurers must have been 27 *per cent.*

The question, therefore, whether the Dutch whale-fishery was, on the whole, of benefit to the

* Had the value of the ships been included in these calculations, instead of the freight or hire, the annual profit *per cent.* on the capital embarked in the trade, would, I imagine, have been reduced to near one-half.

adventurers, meets a satisfactory solution in the affirmative.

It may not be uninteresting, before we quit this subject, to calculate the extent of national emolument which the Dutch have derived from the two fisheries of Greenland and Davis' Straits. Supposing the principle to be correct, that out of 1,800,000*f.*, the advances required for 180 fishing ships, only 237,600*f.*, the proportion expended in foreign produce for stores, and in wages to foreign seamen, and 37,300*f.*, the average value of ships wrecked each year, were loss to the State, in case of no returns being made from the fishery,—we then easily calculate the benefit to the State arising from the known success of the Dutch fleet during the period comprised in the preceding table.

From this table, it appears, that the "amount of receipts" of the whole Dutch Greenland fleet during a period of 107 years, was... .. 222,186,770*f.*

Freight or "receipts" of the Davis' Straits fleet during 60 years,..... 51,643,082

Gross produce of the whale-fisheries, 273,829,852*f.*

Now, the amount of expences of the two fleets, appears to be 218,571,580*f.*; we therefore say, As 1,800,000*f.*, the expenditure

Carried forward, 273,829,852*f.*

Brought forward,	273,829,852 *f.*
of one year, is to 274,900 *f.*, the loss to the State in one year, so is the gross expence of the whole period, 218,571,580 *f.* to the loss to the State out of these expences, provided there had been no returns, ...	33,380,737
The last sum deducted from the gross receipts, gives the apparent benefit afforded to the State from the whale-fisheries during the period in question,.....	240,449,115 *f.*

This balance, reckoning the florin at 20*d.* English, is equal to 20,037,426 *l.* Sterling, or about 156 tons of gold; but if we reckon the florin at 21*d.* English, the value will be equal to about 164 tons of gold!

This tabular view of the Dutch whale-fisheries, likewise shows us the average risk of the trade, as it was then pursued, with regard to the safety of the vessels employed in it. In 107 years, 14,167 ships sailed to the Greenland fishery, whereof 561 were wrecked; or, in a fleet of 100 ships, on an average, 4 were lost each voyage; hence the real risk with respect to premium of insurance, must have been

4 *per cent.* In a period of 60 years, 3161 ships sailed to Davis' Straits, whereof 62 were wrecked; or, in a fleet of 100 ships on an average, 2 were lost each voyage; consequently the real risk with respect to premium of insurance, must have been 2 *per cent.* In the present day, however, the average loss among the British Greenland and Davis' Straits fleets is not one-half so much.

The great balance of profits received by the Dutch whale-fishers during 107 years, amounting to between fifty and sixty millions of florins, was all derived from the trade, during what I have called the third era of their fishery. But the result of the fourth era will be found to be very different.

Between 1785 and 1794, inclusive, the average number of vessels fitted out from Holland for Greenland and Davis' Straits, was 60 sail. Their success in ten years, was 2,295 whales and 55,722 casks of blubber; or 229½ fish, and 5,572 casks of blubber, equal to 7,243½ quardeelen of oil *per* year. This oil, estimated at 35 florins *per* quardeel, produces the sum of, ... 253,522 *f.*

Reckoning for every hundred quardeelen of oil 3,000lb. of fins, gives, for the above quantity of oil, 217,000

Carried forward, 253,522 *f.*

Brought forward,	*f.* 253,522
pounds of fins, which, estimated at 150*f. per* 100lb., amounts to, ...	325,500
Consequently, this part of the national industry of Holland, brought in annually in numerical value, the sum of, ...	*f.* 579,022
The expences of a ship at this period, with an average cargo of 120 quardeelen of oil, is estimated at 13,800*f.*, which, multiplied by 60, the number of vessels employed, amounts to, ...	*f.* 828,000
But the amount of freight as above estimated, was only	579,022
Consequently, there must have been an annual loss to the adventurers of, ...	**f.* 248,978

SECT. IV.

Whale-Fishery of the Spaniards, French, Danes, Germans, Norwegians, Prussians and Swedes.

The BISCAYANS appear to have engaged in the whale-fishery on their own coasts, probably some centuries before the establishment of the fishery at

* Metelerkamp, "Tableau Statistique de la Hollande," p. 37,–40.

Spitzbergen. The whales or *fin-fish* only resorting to the Bay of Biscay, from the autumnal equinox until the spring, they began along with the Basques, in the sixteenth century, to pursue them in their retreat towards the north and west. In this pursuit they were joined by the Icelanders, and for some years their combined fleets conducted a distant and extensive fishery; and were amply recompensed for the trouble and perils of the voyage, by the highly successful issue.

After instructing the English, Dutch, and other nations, in the art of capturing the whale, some of the Biscayans themselves commenced the fishery at Spitzbergen on their own account. One Spanish ship, indeed, piloted by an Englishman, fished at Spitzbergen in 1612; but it was some years afterwards, before this fishery by the Spaniards became general. The most eligible harbours on the west coast being already occupied as fishing stations, they took possession of a situation on the northern face of Spitzbergen, whither they regularly resorted with their ships. It does not appear, however, that their fishing concern was at any time very extensive, since a great proportion of their fishing officers seem to have been employed, for many years, in the service of other northern adventurers. It is evident, that after the different nations were sufficiently instructed in the art, the custom of hiring these foreigners would fall into disuse, especially as it

must have been attended with no inconsiderable expence; and, therefore, the skilful Biscayans might, possibly, be sent out to Spitzbergen on the same employment by their own countrymen. Of the extent of their fishing concerns, excepting at particular times, we have no account. In the year 1721, twenty ships were sent on the whale-fishery from different ports in the Bay of Biscay; but towards the latter part of the last century, it would appear that the Biscayans had totally abandoned this occupation.

From the researches of M. S. B. J. NOEL *, it seems probable, that the FRENCH had not only an early knowledge of the use of the harpoon in the capture of the whale, but that they were actually engaged in this enterprise in the 14th century; and it is not very certain, but they commenced this occupation on some parts of the coast of France even some centuries earlier. In the early whale-fishery, however, by the French, as well as in that by the English, we labour under some difficulty in drawing conclusions from ancient charters, grants, &c. to decide, whether they refer to whales accidentally stranded, forced on shore by the pursuit of boats, or captured in the main sea. On the whole, I consider there is reason to suppose, that in some of the

* "Memoire sur l'Antiquité de la Pêche de la Baleine," &c.

instances quoted by M. NOEL, an actual whale-fishery must be referred to.

Though the whale-fishers inhabiting the shores of the Bay of Biscay, spoken of in the preceding pages, were principally Spaniards *, yet some of them were evidently French, and consequently the whale-fishery of this nation is partly involved in that of the Biscayans. As it would be needless to repeat here what has already been advanced, it will be necessary only to observe, that when they began to pursue the fin-whales from the Bay of Biscay to the high sea, the numbers taken were so considerable, that, according to Rondelet, about the year 1554, the fishers of the coast of Bayonne made use of the bones of the whale for the inclosures of their gardens †. The French sent ships to Spitzbergen at a very early period, as appears by the account of all the rival fishers being driven out of the country by the Russia Company's ships, in the year 1613, excepting some French ships, which they permitted to fish there, on payment of a certain tribute of whales. After this time, the French were in the habit of frequently visiting the Spitzbergen fishery, and occasionally with a considerable number of ships, though it seems they seldom used to resort to the bays, but usually fished in the open

* Beschryving, &c. vol. i. p. 26,-27.

† "Memoire," p. 12.

sea, and brought home their cargoes in the raw state. When Soccoa, Cibourre, and St Jean de Luz, were taken and plundered by the Spaniards in 1636, they likewise seized upon 14 large ships laden with blubber, as they returned from the Greeenland seas *.

The French, who greatly neglected the fishery in the 17th century, made an attempt to revive this branch of trade in 1784. Six ships fitted out at Dunkirk, at the expence of Louis XVI., made some successful voyages, both in the northern and southern whale-fishery. The advantages of the trade were obvious, and the French Government were eager to improve them. In 1786, some of the inhabitants of the Island of Nantucket, near Halifax, in North America, were invited to settle at Dunkirk, to carry on the fishery †. Several families accepted the invitation, and to encourage them to prosecute the trade, they were permitted to enjoy peculiar privileges and immunities. Ships were sent out to different seas, and had prosperous voyages. But this trade, as well as almost every other branch of French commerce, was completely interrupted by the Revolution, and the particular circumstances in which that nation was placed with regard to foreign powers.

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* "Memoire," &c. p. 13.

† Ency. Brit. 4th edit. Art. *Cetology*.

The DANES first resorted to the coast of Spitzbergen in the year 1615, when they appeared in the fishing seas with three men of war, and demanded tribute from the English. Their plea was, that they were the original discoverers of West Greenland, of which country these islands were at first supposed to be an extension, and, as such, claimed the Islands of Spitzbergen, and imagined they were entitled to tribute from all other nations resorting thither. The English, however, very properly resisted this assumption, and preferred their own claim, but on a ground scarcely more tenable than that of the Danes. They declared themselves to be alone entitled to all advantages derivable from the Spitzbergen whale-fishery, in consequence of the supposed discovery of this country by Sir Hugh Willoughby in 1553; but more plausibly, however, in virtue of the discovery of the Spitzbergen fishery by the English adventurers in the year 1610.

Shortly after the first visit of the Danes to Spitzbergen, other ships adapted for carrying on the whale-fishery were sent out; and these were allowed to occupy a small island and convenient bay, lying between the possessions of the English and the Dutch, in the 80th degree of north latitude. In 1620, the King of Denmark established a Greenland Company, which was to have sent out two ships yearly to the whale-fishery; but in 1624 it

was dissolved, the company being so poor that they could not continue the trade. Any Danish burgher was then declared to be at liberty to pursue the fishery. Another company, established in 1636, sent out ships, which neglected the fishery, and confined their operations to searching for gold and silver. Their search being unsuccessful, the company was discouraged, and speedily relinquished any further speculation *. In the year 1697, they sent four ships to Greenland, which procured 4710 puncheons of oil. In 1751, an ordinance was passed in favour of the Chartered Greenland Company, prohibiting all others, both natives and foreigners, from trading to any of the colonies established in Greenland, or within fifteen miles thereof, under penalty of seizure and confiscation. In 1753, their whale-fishing concerns established in different ports had increased to 90 sail, the cargoes of which, in this year, amounted to 344 whales †.

The Greenland fishery afterwards declined, and was disused by the Danes for many years, before any attempt was made to revive it. "In 1785, the King of Denmark granted a bounty of about 30*s.* Sterling *per* ton, to all vessels in the Greenland and Icelandic fisheries, on condition of their fitting out their ships, and selling their cargoes in a Danish

* Forster's Voyages and Discoveries in the North, p. 471.

† Gent. Mag. vol. xxi. p. 189.; and xxiv. p. 42.

port. Foreign built ships were employed, foreigners were encouraged to promote the view, and even foreign manufactures necessary for the Greenland fishery, were allowed duty-free *." After this period, the whale-fishery was generally prosecuted by private adventurers, but at no time with any very great energy. Twenty-seven ships were fitted out of Frederickstadt in 1803, and eight from Copenhagen, of which three were wrecked †.

Among the ports of GERMANY, that of *Hamburgh* occupies the most respectable place in the annals of the whale-fishery. The Hamburghers commenced the fishery immediately after the Danes, and established themselves on the west coast of Spitzbergen, in a small bay situated near the Seven Icebergs, discovered by themselves, which was found to be but little incommoded with ice, and was, therefore, very suitable as a fishing station. This place still retains the name of Hamburghers Bay. From a table of the whale-fishery by the Hamburghers, given by Zorgdrager, it appears, that they long prosecuted the trade with success. From 1670 to 1719, a period of fifty years, 2289 ships were sent out to Spitzbergen from Hamburgh, whereof 84 were wrecked; the remainder captured and took home the produce of 9976 whales, which

* Oddy's European Commerce, p. 525. † Idem.

afforded 444,607 casks of blubber, being on an average of the whole number of ships fitted out, 4.36 fish or 194.2 barrels of blubber *per* ship each voyage. During the same period, the average success of the Dutch Greenland fishery was 4.96 fish *per* ship each voyage. The proportion of ships lost by the Hamburghers was 3.7 in 100, and by the Dutch only 1.8 in 100, during the same time*.

Thus far the success of the Hamburghers in the whale-fishery, was very uniform with that of the Dutch; but the proportion of ships lost in the ice by the Hamburghers, was double that of the Dutch.

In each of the years 1672,–73,–78,–80,–97, and 1701, the whale-fishery of the Hamburghers produced from nine to eleven whales *per* ship; but in the years 1688,–89,–91,–1706,–10,–18, and 19, the average was only $\frac{7}{10}$ths of a fish *per* ship; 311 ships which were fitted out, having only procured in the seven years 215¼ whales. From 1719 to the present time, the fishery of the Hamburghers was rarely suspended, but was generally conducted on a respectable scale, and with like success as that of the neighbouring provinces of Holland. The Greenland ships fitted out of Hamburgh in 1794, consisted of 25 sail; in 1795, 18; 1796, 19; and in 1797, 19. In 1802 the Hamburgh fleet consisted of 15 sail, and their cargoes amounted to 62 whales, or 1011 casks of blubber, which produced 3409 barrels of oil.

* Zorgdrager's Groenlandsche Visschery, p. 262,–270.

The whale-fishers from other ports of the Elbe, have, in general, held a place of some importance, especially those of Altona, which for many years regularly embarked in the trade. In 1802, Altona sent out ten ships, which took home only 304 casks of blubber, or 1536 barrels of oil, the produce of 21 whales. Eleven ships from Gluckstadt, the same year caught only 24 fish, which afforded 346 casks of blubber, or 3124 barrels of oil. And two ships from the eastern ports procured 8 fish, yielding 508 barrels of oil, from 145 casks of blubber *.

The port of Bremen, in the Weser, sent twelve ships on the fishery in 1697, the united cargoes of which consisted of 3,790 puncheons of blubber; and in 1721, a fleet of twenty-four ships sailed from the same port. In 1802, the Bremen Greenland fleet consisted of eight ships; and the same number the following year, which caught 14 whales, producing 1250 butts of blubber †. The whale and seal fishers from the Elbe and Weser, amounted to 42 sail in the year 1817, and were increased to 53 in 1818 ‡.

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* Oddy's European Commerce, p. 420. † Idem, p. 444

‡ 1817, From Hamburgh, 12
Altona, 7
Gluckstadt, 12
Bremen, 7
4 other Ports, 4
42

1818, From Hamburgh, 13
Altona, 9
Gluckstadt, 17
Bremen, 8
5 other Ports, 6
53

The account of the early whale-fishery of the NORWEGIANS, as presented to us in Alfred's Orosius, has been already sufficiently considered. Their fishery at Spitzbergen seems never to have employed many vessels, and their enterprises thither to have been only occasional. A company established at Bergen for trading with the Greenlanders, made a feeble effort in 1721 to commence a whale-fishery at Davis' Straits; but after continuing it occasionally for a few years with constant bad success, they abandoned the business; but in the year 1733, they took the resolution of attempting it again *.

In addition to those nations which have speculated in the whale-fishery already enumerated, I may mention, that the King of PRUSSIA ordered the equipment of some ships in 1768; and that the Government of SWEDEN in 1774, granted to a company established at Stockholm, the exclusive privilege of the Greenland and Davis' Straits fishery for twenty years, and with a view of promoting an undertaking so useful to the State, assisted the adventurers with the loan of 500,000 dollars, at an interest of 3 *per cent* †.

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* Hist. des Pêches, vol. iii. p. 20.

† Macpherson, vol. iii. p. 557.

CHAPTER III.

SITUATION OF THE EARLY WHALE-FISHERY,—MANNER IN WHICH IT WAS CONDUCTED,—AND THE ALTERATIONS WHICH HAVE SUBSEQUENTLY TAKEN PLACE.

IMMEDIATELY after the rediscovery of Spitzbergen by Hudson, in the year 1607, the walrus-fishers, who carried on an extensive and profitable business at Cherry Island, finding the animals of their pursuit become shy and less abundant, extended their voyage to the northward, until they fell in with Spitzbergen, the newly discovered country, about the time when the Russia Company equipped their first ships for the Greenland whale-fishery. As the coast abounded with whales and sea-horses, Cherry Island was deserted, and Spitzbergen became the scene of future enterprise.

At this time, the mysticetus was found in immense numbers throughout the whole extent of the coast, and in the different capacious bays with which it abounds. Never having been disturbed, these animals were unconscious of danger, and allowed themselves to be so closely approached, that

they fell an easy prey to the courageous fishermen. It was not necessary that the ships should cruize abroad throughout the extended regions of the Polar Seas, as they do at the present time; for the whales being abundant in the bays, the ships were anchored in some convenient situation, and generally remained at their moorings until their cargoes were completed. Not only did the coast of Spitzbergen abound with whales, but the shore of Jan Mayen Island, in proportion to its extent, afforded them in like abundance.

The method used for capturing whales, at this period, was usually by means of the harpoon and lance, though the Dutch inform us that the English made use of nets made of strong ropes for the purpose *. The harpoon, which was the instrument used in general practice for effecting their entanglement, consisted, as at present, of a barbed or arrow-shaped iron dart, two or three feet in length, to which was attached a wooden handle for convenience in striking or throwing it into the whale. Fastened to the harpoon, was a line or rope 300 fathoms in length; more than sufficient to reach the bottom in the bays, where the depth of the water seldom exceeds 80 or 100 fathoms; so that, on a fish descending after being struck, the end of the line could always be retained in the boat.

* Beschryving, &c. vol. i. p. 27.

The movements of this boat, of course, corresponded with those of the whale; and so closely pointed out its position, that, on its re-appearance at the surface, the other assisting boats were usually very near the place. It was then vigorously pursued,—secured by a sufficient number of harpoons,—and lastly attacked repeatedly with lances until it was killed. The lance in use was an iron spear, with a wooden handle, altogether 10 to 12 feet in length. The capture of the fish, in which, owing to the particular excellence of the situation, they seldom failed, being accomplished, it was towed by the boats, rowing one before another, "like a team of horses," to the ship's stern, where it lay untouched, from one * to two or three days †. The fat being then removed, was carried to the shore; where ample conveniences being erected, it was afterwards subjected to heat in a boiler, and the greater part of the oil extracted.

As the process in use by the early fishers for extracting the oil, may be interesting to some readers, I shall attempt to describe it, following the accounts by Captains Anderson and Gray, whose papers on Greenland and the whale-fishery, embracing this subject, are preserved among the manuscripts in the British Museum ‡.

* Mr Gray's Account of the Whale-fishery, MS. Brit. Mus.

† Captain Anderson's Account of Greenland, Idem.

‡ There is no date to the papers of Messrs Anderson and Gray; but, as Anderson was the person, (according to his

The blubber being made fast to the shore, a "water-side-man," standing in a pair of boots, mid-leg in the sea, flayed off the fleshy parts, and cut the blubber into pieces of about 2 cwt. each. Two men with a barrow then carried it piece by piece to a stage or platform erected by the side of the works, where a man, denominated a "stage-cutter," armed with a long knife, sliced it into pieces 1½ inches thick, and about a foot long, and then pushed it into an adjoining receptacle, called a "slicing cooler." Immediately beyond this cooler, five or six choppers were arranged in a line with blocks of whales-tail before them; and adjoining these blocks, was another vessel called a "chopping cooler," of two or three tons capacity. These men being situated between the two coolers, took the sliced blubber from the slicing cooler, and after reducing it into little bits, scarcely one-fourth of an inch thick, and an inch or two long, pushed it into the chopping cooler. These operations were carried on as

MS.) who took in eight men, whose ship sailed when they were engaged in hunting, and left them to winter in Spitzbergen in 1630,—the period here referred to, must have been within a few years of this time. Gray's paper was registered by Mr Oldenberg, Secretary to the Royal Society, in the year 1662,-3; so that both papers must refer to the same period of time, within a few years at the most. Gray's paper, (the one I have principally followed,) is by far the most clear and precise. It is contained in the "Bibl. Sloan." N°. 698. Art. 27.; and Anderson's paper in the same department, N°. 3985. Art. 22.

near as convenient to the place where the copper was erected. The copper held only half a ton. It was furnished with a furnace and the requisite appendages. A man, designated "tub-filler," with a ladle of copper, was employed in filling a hogshead with chopped blubber, dragging it to the copper, and emptying it in, until the copper was full. A fire of wood was in the first instance applied; but after a copper or two had been boiled, the *finks* or *fritters* were always sufficient to boil the remainder without any other fuel.

When the blubber was sufficiently boiled, two men, called "copper-men," with two long-handled copper-adles, took the oil and finks out of the copper, and put it into a "fritter barrow," which, being furnished with a grating of wood in place of a bottom, drained the oil from the fritters, from whence it ran into a wooden tank or cooler of about five tons capacity. Three coolers were usually provided, and placed some feet asunder, a little below each other. A quantity of water was put into each before the oil, and the oil, whenever it came to a certain height in the first cooler, escaped through a hole by a *spout* into the second, the same way into the third, and from thence by a *plug-hole* into the casks or butts in readiness for its reception. When the oil in these butts was thoroughly cold, whatever it had contracted was filled

up, and the casks then rolled into the water, and in rafts of 20 together, were conveyed to the ship.

The whalebone was separated from the gum or substance in which it is embedded, rubbed clean, packed in bundles of 60 laminæ or blades each, and taken to the ship in the longboat. Thus prepared, the cargo was conveyed home, either when a sufficiency was procured, or the close of the season put an end to the fishing occupations.

The whale-fishers had different other buildings on shore besides those made use of in boiling the blubber. Those of the English, in one harbour, consisted of a stone hut or tent, covered with wood, and fitted up with cabins, &c. for lodging the blubber men in, and a large cooperage, with a lodging-room above it, for the use of the coopers when employed preparing the casks. In Bell Sound, the English had a wooden house covered with Flemish tiles, originally built by the Flemings, 80 feet in length, and 50 in breadth, besides other smaller tents. And in addition to similar structures, the Dutch are said to have built warehouses, dwelling-houses, and forts.

While some of the people belonging to the whale ships were engaged in boiling the blubber, the rest of the crew, it is probable, were occasionally employed in the capture of other whales.

Each nation which resorted to Spitzbergen, having a different fishing station, completely occupied

it, and retained it tenaciously for its own use. As a place of resort, however, for escaping a storm, a contrary wind, or any other especial convenience, save that of fishing, the harbours were open to all.

So long as the whales resorted to the bays of Spitzbergen in sufficient abundance, the method of fishing first adopted, continued to be practised; but when the trade increased, and the annoyance to their species became so very great that they took the alarm and gradually receded from their favourite haunts, a suitable change in the fishery was requisite. For twenty years after the commencement of the Spitzbergen fishery, the trade was in its most flourishing state; the fish were numerous and unwary, and the adventurers seldom failed to fulfil the intentions of the voyage, by procuring ample cargoes. The fish seem to have become scarce in the bays about the years 1630 to 1640; upon which, the fishery frequently failed, and the Dutch companies were subjected to such heavy losses, that their great profits of former years were almost swallowed up *. Still, however, the whales were occasionally found in plenty, in particular places along the coast, or on particular banks, where some skilful and active individuals, made very profitable voyages †. So long as the whales remained

* Histoire des Pêches, vol. i. p. 307.

† Beschryving, &c. vol. i. p. 31.

in the immediate vicinity of the fishing establishments, the boats were sent out of the bays, the fish captured at sea, towed into the harbour, stripped of the fat, and the blubber boiled as formerly *; but as the whales increased their distance, this plan of procedure became inconvenient; so that the ships began to cruise about the sea †, to kill the whales wherever they found them, to take on board the blubber, and only occasionally to enter a port for the convenience of making off, or awaiting, when the weather was unfavourable for fishing, an appropriate change.

The different operations connected with the fishery being now more tedious, so far from having occasion for empty ships for carrying away the superabundant produce ‡, it was a matter of difficulty and uncertainty the procuring a cargo at all; and with the most prosperous issue, there was not sufficient time for landing the cargo and extracting the oil §: the blubber was, therefore, merely packed in casks and conveyed home, where the remaining operations of extracting the oil, and cleaning and preparing the whalebone, were completed. Hence the various buildings which had been erected at a great expence became perfectly useless; the cop-

* Beschryving, &c. vol. i. p. 31.

† Idem, p. 30.

‡ Idem, vol. i. p. 29

§ Idem, p. 30.

pers and other apparatus that were worth the removal were taken away, and the buildings of all the different nations, both at Spitzbergen and at Jan Mayen Island, were either wantonly razed to the ground, or suffered to fall into a state of decay *.

Martin, who sailed to Spitzbergen in 1671, observed several buildings connected with the "Harlem Cookery" still remaining. They consisted of two dwelling-houses and two warehouses. He also noticed a kettle and coolers, a smith's anvil, tongs, and other tools, frozen among the ice.

When the whales first approached the borders of the ice, the fishers held it in such dread, that whenever an entangled fish ran towards it, they immediately cut the line †. Experience through time, inured them to it; occasionally they ventured among the loose ice, and the capture of small whales at fields was at length attempted, and succeeded. Some adventurous persons sailed to the east side of Spitzbergen, where the current has a tendency, it is believed, to turn the ice against the shore; yet here finding the sea on some occasions open, they attempted to prosecute the fishery, and it seems with some success, a great whale-fishery having been made near Stans Foreland in the year 1700.

The progress of the retreat of the whales from the bays, first to the sea-coast, from thence to the

* Beschryving, &c. vol. i. p. 30. † Idem, p. 32.

banks at a distance from land, then to the borders of the ice, and finally, to the sheltered situations afforded by the ice, appears to have been fully accomplished about the year 1700, or from that to 1720. In consequence of this event, the plan of prosecuting the fishery, which, previous to this period, had undergone different alterations, now underwent a material change. This change did not only affect the manner of conducting the fishery, but it likewise extended to the construction of the ships, and the quality and quantity of the fishing apparatus. When the fishery could be effected entirely in the bays, or even along the sea-coast, any vessels which were sea-worthy, however old or tender, were deemed sufficient to proceed to Spitzbergen, and were generally found adequate to the purpose; especially as it was customary to allow the spring to be far advanced before they set out, whereby they avoided the inconvenience and obstruction to the advance of the ships into fishing stations, which is often presented by the ice in the early part of the spring of the year; and, what was of equal consequence, they escaped those tremendous and destructive storms, to which the whale-fishers in modern times, who set out at an earlier period, are constantly exposed. On account of the increased exposure to the ice, new, or at least very substantial ships became requisite; and even these, it was found necessary to strengthen by additional timbers

on the bows and stem, and additional planks on the sides. Besides the increased expence of the ships, a greater quantity of fishing stores became needful. When fishing among the ice, the whales, after having been struck, frequently penetrated to a great distance, out of the reach of their assailants, dragging the line away, until at length they found it necessary to cut it, to prevent farther loss. Hence, by the frequency of disasters among their ships, the increased expence of their equipment, and the liability of losing their fishing materials, such an additional expence was occasioned, as required the practice of the most rigid economy to counterbalance. The destruction among the shipping by the ice, in the Dutch fleet alone, was frequently near twenty sail in one year, and, on some occasions, above that number. The Greenlandmen of the present day, being mostly ice fishers, an account of the improved mode of fishing now practised, will be sufficient for the illustration of the method followed by the Dutch and other nations at a more early period; particularly, as the way in which the whale is pursued and killed, is pretty nearly the same at this time as it was a hundred years ago; the improvements being confined to an increase of application, perseverance and activity, the effects of which, as I have before noticed, are truly wonderful.

Davis' Straits, or the sea lying between the West side of *Old* Greenland and the East side of North

America, and its most northern islands, has generally, since the close of the 17th century, been the scene of an advantageous whale-fishery. This fishery was first attempted by the Dutch in 1719, as has before been mentioned; after which period, it was usually resorted to by about three-tenths of their whalers, while seven-tenths proceeded to Spitzbergen. The whale-fishery of Davis' Straits, is conducted in an extensive limit, and differs only from that of Spitzbergen or Greenland, in the sea being in many districts less incommoded with ice, and in the climate, on account of its lower latitude, or the influence of the land in receiving and dispersing the heat derived from the sun, being somewhat more mild. The alterations which have taken place in this fishery, are in some measure similar to what have occurred at Spitzbergen. The fish which, half a century ago, appear to have resorted to all parts of the western coast of *Old* Greenland, in a few years retired to the northward, but they still remained about the coast. Within a very few years, however, of the present, they deserted some of the northern bays in which they used to be captured in considerable abundance, and have of late been principally caught in icy situations, in a high latitude, or in the opening of Hudson's Straits, or at the borders of the western ice near the coast of Labrador.

Baffin's Bay was suggested as an excellent fishing station, by the voyager whose name it bears, so early as the year 1616, when his memorable navigation was performed. Baffin, in a letter published by Purchas *, addressed to J. Wostenholm, Esq. one of the gentlemen who shared in the expence of the expedition, remarks the probability of profit which might be derived from future voyages to this Bay as a fishing station, observing, that great numbers of whales occur in the bay, and easy to be struck; and though ships cannot reach the proper places until 'toward the middle of July, "yet they may well tarry till the last of August, in which space much business may be done, and good store of oil made."

To this situation, where the whales have never been molested, until two years ago, it appears they still resort in the same manner, and in similar numbers, as in the time of Baffin. In 1817, two or three of the Davis' Straits whalers proceeded through the Straits into Baffin's Bay to a much greater length than they were in the habit of adventuring; where, in the month of July and August, they found the sea clear of ice, and in some parts abounding with whales. A Leith ship, which it appears advanced the farthest, made a successful fishery, in latitude 76°–77°, after the season when it was usual for

* Vol. iii. p. 843.

ships to depart. This fact having become generally known, several other ships followed the example in the last season (1818), and persevered through the barrier of ice lying in 74°–75° towards the north. After they had succeeded in passing this barrier, they found, as in the preceding year, a navigable sea, where several ships met with considerable success in the fishery, at a very advanced period of the season.

This discovery, therefore, of the practicability of pursuing the whales to their most northern retreats, and thus prolonging the fishery to a much later period than was before usual, is likely to prove an era of great importance in the fishery of Davis' Straits. Ships which fail of success in the old stations, will still, in the new fishery, have a reserve of the most promising character. And instead of the fishery being terminated by the disappearance of the whales from the old stations, it is probable it will in future be only terminated by the setting in of the frost. There is rarely any thick ice formed in June, though the sea be constantly at or near the freezing temperature; much less will there be a liability to strong ice being formed in September, which is but $3\frac{1}{2}$ degrees colder than June, when the sea has had the effect of the warmth of two months, during which the mean temperature of the air is usually from 6° to 9° above the freezing point of sea-water. Hence, instead of this fishery being necessarily closed in July,

the period when the whales have usually made their final retreat from the old fishing stations, it will in future be extended to the end of August at least; and it may ultimately appear, that there will be little danger of ships being permanently frozen up, unless previously beset in the ice, during any part of the month of September.

CHAPTER IV.

ACCOUNT OF THE MODERN WHALE-FISHERY, AS CONDUCTED AT SPITZBERGEN.

SECT. I.

Description of a well-adapted Greenland Ship, with the additional Strengthenings requisite for resisting the Concussions of the Ice.

A SHIP intended for the Greenland or Davis' Straits trade, should, I conceive, be of three to four hundred tons admeasurement,—very substantially built,—doubled and fortified;—should have six or seven feet perpendicular space between decks,—should be furnished with a description of sails which are easily worked,—and should possess the property of fast sailing.

The most appropriate dimensions of a ship intended for the northern whale-fisheries, seems to be that which is so large, as to be capable of deriving the greatest advantage from the best opportunity, and no larger.

A vessel of 250 tons requires nearly the same number of men, the same quantity of provisions and stores, and the same expence of outfit, as a ship of 350 tons burden; while the difference in the cargoes of the two vessels when filled, is, in one voyage, more than a compensation for the difference in the first expence. Besides, for want of similar room and convenience, the smaller ship has not always an equal chance of succeeding in the fishery with the larger. And as ships of about 350 tons burden have been occasionally filled, it is clear, vessels of 250 tons are too small for the fishery.

In a voyage of confined duration, in which the opportunities of procuring a full cargo are but rare, the magnitude of the cargo, which may with usual means be obtained, is necessarily limited; and notwithstanding it is impossible to state what that limit in future may prove, yet we form an opinion from what it has heretofore been.

Ships of 350 tons burden, it has been observed, have been occasionally filled; but we know of no instance in which a ship of 400 tons admeasurement, of the usual capacious build, has been deficient in capacity for taking in as large a cargo as of late years there has been any opportunity of procuring; hence we consider, that an increase of dimensions above 400 tons, is not only useless, but of actual disadvantage.

As on the one hand, a ship of 250 tons burden is too small, inasmuch as her capacity will not admit of the most advantageous use being made of the plentiful fisheries which sometimes occur, so, on the other hand, a ship of 450 or 500 tons is too large, because, with the most prosperous fishing, there would not be a probability, or scarcely a possibility, that she should ever be filled. We, therefore, conclude, that a ship of intermediate size between 300 and 400 tons, is best adapted for the fishery. And, on the whole, perhaps, a roomy ship of 330 or 340 tons, possesses more advantages, with fewer disadvantages, than a vessel of similar build of any other capacity *.

Greenland ships, in the early ages of the fishery, were very indifferent structures; and even within the last thirty years, when the fishers were not much in the habit of penetrating far into the ice, shipping of inferior quality were generally deemed sufficient for the trade. At present, however, when a good fishery is rarely made, without frequent exposure to the ice, and sometimes in very critical situations, the vessels require to be *substantially* built, for the purpose of resisting the occasional pressure of, and frequent blows from the ice, to which the ships of persevering fishermen must always be more or less exposed.

* For the farther investigation of the advantages and disadvantages of ships of different sizes, see Appendix to this Volume, No. II.

The requisites peculiar to a Greenland ship, the intention of which is to afford additional strength, consist of doubling, and sometimes trebling, and fortifying.

The terms "doubling" and "trebling," are expressive of the number of layers of planks which are applied to the exterior of a frame of timbers; hence a ship which has one additional series of planks, is said to be *doubled;* and such ships as are furnished with two, or part of two additional layers of planks, are said to be *trebled.* Doubling generally consists of the application of 2 or 2½ inches oak plank near the bow, diminishing towards the stern to perhaps half that thickness, and extending, in one direction, from the lower part of the main-wales, to within six feet (perpendicular) of the keel forward, and to within eight or nine feet abaft; and, in the other direction, that is, fore and aft wise, from the stem to the stern post. Doubling is used for producing an increase of strength; and, at the same time, for preserving the outside or main planks of the ship, from being injured by the friction of passing ice. Trebling, which commonly consists of 1½ to 2 inches oak plank, is generally confined to the bows of the ship, and rarely extends farther aft than the fore chains, or chess-tree. It is seldom applied, but to second rate ships. Its principal use is to increase the strength of the ship about the bows; but it also

serves to preserve that part of the doubling which it covers, from being destroyed by the ice.

Fortifying, is the operation of strengthening a ship's stem and bows, by the application of timber and iron plates to the exterior, and a vast number of timbers and stanchions to the interior. When it is required to be very strong and complete, the operation is generally performed somewhat in the following manner. Four straight substantial oak-timbers, called *ice-beams*, about 12 inches square and 25 feet in length, are placed beneath the hold beams, butting with their foremost extremities against a strong fore-hook, and extending nearly at right angles, across three or four of the hold beams, into each of which they are notched and secured at the point of intersection, by strong iron bolts, with the addition of cleats on the aftermost beam. The fore part of the ice-beams, which butt against the hook, are placed at a small distance from each other; from thence they diverge in such a way, that their other extremities divide the aftermost beam under which they pass, into five equal parts. The next important part of the fortification is the *pointers*, which consist of four or more crooked timbers, fitting the curve of the ship's bow on each side; these are placed below the hold beams, against the inside of the ceiling, nearly parallel with the direction of its planks, some butting against the fore-hooks, and others passing between them. They

are secured by tree-nails and bolts driven into the timbers of the ship's bow. Across these pointers four or five smaller timbers, called *riders*, disposed at regular distances, are placed at right angles; that is, in the same direction as the ribs of the ship. Now, from each of the points of intersection of the riders and pointers, consisting of 16 or 20 on each side of the ship, a *stanchion* or shore proceeds to the edge of one of the two ice-beams, placed on the same side, where it is secured in a *rabbet*. About five of these shores pass from the intersections of the riders with the upper pointer, to the external or nearest ice-beam; five others from the intersections of the riders with the lower pointer, to the second ice-beam; and the remaining ten, from the intersections of the riders on the middle pointers, are equally distributed between the same two ice-beams lying on that side. Eight or ten shores, therefore, terminate in the rabbet of each ice-beam. Lastly, the ice-beams are supported and connected by several strong pieces of wood, placed between each two in different parts, called *carlings*, whereby they are made to bear as one. Hence, it is evident, that a blow received on the starboard bow, will be impressed on the adjoining pointers, and the impression communicated through the medium of the lateral timbers or shores to the two ice-beams on the same side; from thence by the carlings to the other ice-beams, and then by the shores on the opposite side;

to the larboard bow and annexed pointers. Thus the whole fore part of the ship is so consolidated, that a blow cannot be received on any part of one bow, without being communicated by the fortification to every part of the opposite bow; while every part to and through which the impression is communicated, must tend to support that place on which the blow is impressed. Every part of the bows, therefore, from the stem to the fore-chains, derives additional strength from the fortification. The stem itself is likewise supported by such parts of the fortification as butt against the fore-hooks; these consist of all the ice-beams and some of the pointers.

To preserve the stem from being shattered or bruised by direct blows from the ice, it is strengthened by an extra piece applied to the front, called the *false* or *ice* stem. On the sides of this are placed the *ice-knees*, which are angular chocks or blocks of wood, filling the concavity formed by the stem and bow planks, and extending from about the eight feet mark to the loading mark. In the best style, the ice-knees are twelve to fifteen inches in thickness at the stem, diminishing to, perhaps, six or eight inches thick, at the distance of about eight feet from the stem, from thence gradually becoming thinner, until they fall into, and incorporate with the common doubling, below the fore part of the fore-chains. This makes a neat bow; and, in point of

strength, is much preferable to the angular chocks or knees, which usually extend but five or six feet from the stem, and then terminate somewhat abruptly upon the doubling. Ice-knees not only strengthen the front of the bows, and prevent the main planks from being bruised or shattered, as far as they extend, but likewise protect the stem from the twisting effect of a side blow. The stem, and a small part of the ice-knees adjoining, are still farther defended by plates of half-inch iron, called *ice-plates*, which are nailed upon the face of the ice-stem, and partly on the ice-knees, to prevent them being cut by the ice.

Such are the principal requisites for strengthening ships intended for the northern whale-fisheries. There are, likewise, other peculiarities in their structure, which the nature of the trade requires.

For additional strength as well as convenience, the hold beams of a Greenland ship should be placed low, or at a greater distance from the deck beams than is usual in other merchantmen, leaving a clear space of six or seven feet between decks. The strength derived from hold beams laid in this position, is principally serviceable when the ship is squeezed between two sheets of ice; because, the nearer the pressure acts on the extremities of the beams, the greater is the resistance they are calculated to offer. And with regard to convenience, a large space between decks is useful in various points

of view: it admits of a considerable portion of the boats being carried out *below*, thus effectually preserving them in heavy storms, in which, sometimes, boats lashed upon deck, are subject to be washed away or otherwise destroyed, while, at the same time, the deck is freed from unnecessary lumber and weight. It is likewise of great advantage in the event of a successful fishery, as it admits of a greater quantity of blubber being taken in at once, besides facilitating many of the operations connected with the fishery. This position of the hold beams, though it takes from the capacity of the hold, does not, of course, affect the dimensions of the hull; and in a ship of 350 tons, it will generally leave such a space in the hold as will admit of *three* tiers of casks, of 300 to 350 gallons capacity, and be completely filled by them; whereas, if the dimensions of the hold were enlarged by the beams being elevated, it would require *four* tiers of convenient sized casks to fill it; which additional tier, would occasion an amazing increase of labour in the different processes connected with the packing of blubber in Greenland.

Hammocks, as receptacles for sailors' beds, being incommodious, the crew are lodged in cabins or *births*, erected in the half deck: these consist of from twelve to twenty in number, each of which is calculated to contain two or three persons.

When a ship is on fishing stations, the boats are required to be always ready for use; as such, they

are suspended from *davits* or cranes fixed on the sides of the ship, and are usually so contrived, that a boat can be lowered down into the water, manned and pushed off from the ship, in the short space of a minute of time. Prior to the year 1813, a ship having seven boats carried one at each *waist*, that is, between the main-mast and fore-mast, two at each *quarter*, one above the other, and one across the stem. As an improvement on this plan, in 1813, the Esk of Whitby and John of Greenock, had each their boats fixed in a line of three lengths of boats on each side. In the usual way of suspension, it was necessary that the under quarter boats should be taken upon deck in every storm, accompanied by a high sea,—an operation which, on some occasions, was scarcely practicable. They were, likewise, subject to be damaged by the passing ice. The mode adopted in the Esk and John, in a great measure avoids both these inconveniences; besides which it is attended with the peculiar advantage of admitting any particular boat of the seven to be lowered by itself, or all the seven boats at the same time. These advantages of the new manner of suspending the boats were at once so evident, that the plan was adopted in almost every new ship subsequently fitted for the fishery, and in almost every old ship in the trade, excepting where want of length, or the consideration of the expence requisite for making the alteration, prevented it.

The masts and sails of a Greenlandman are not without their peculiarities. As it is an object of some importance, that a fishing ship should be easily navigated, under common circumstances, by a boat's crew of six or seven men, it is usual to take down royal masts, and even some of the top-gallant-masts, and sometimes to substitute a long light pole in place of a mizen-top-mast; also to adopt such sails as require the least management. *Courses* set in the usual way require a number of men to work them when the ship is tacked: A course, therefore, made to diminish as it descends, that is, narrowest at the *foot* or lower part, and extended by a boom or yard below as well as above, and this boom fastened by a tackle fixed at its centre to the deck, swings with the yards with little or no attention, and is found particularly convenient. Fore-sails, on this principle, have been in use about six or seven years. In 1816, I fitted a main-sail and cross-jack in the same way, the former of which we found of admirable utility. *Boom-courses* * are not only convenient in tacking, but are likewise a valuable acquisition when sailing among crowded dangerous ice. As the safety of a ship then depends, next to the skilfulness of the piloting officer, on a prompt

* To prevent confusion in speaking of these sails, I have confined the term *boom*-sails to the new description of courses; and *gaff*-sails to the fore and aft sails, the tops of which are extended to a gaff.

management of the yards and sails, boom-courses are strikingly useful, on account of the little attention they require, when any alteration in the position of the sails becomes necessary. And when the ship's head-way is required to be suddenly stopped, in a situation where she cannot be *luffed into the wind*, boom-courses swinging simultaneously with the top-sails, are backed without any annoyance from tacks or sheets, and of course assist materially in effecting the intention. Such is the advantage of this description of sails, that on one occasion when all the rest of my crew were engaged in the capture of a whale, with the assistance of only two men, neither of them sailors, I repeatedly tacked a ship of 350 tons burden under three courses, top-sails and top-gallant-sails, together with jib and mizen, in a strong breeze of wind. *Gaff-sails*, between the masts, in the place of stay-sails, are likewise deservedly in much repute. To the mizen and try-sail or gaff main-sail, that have been long in use, I have added a gaff fore-sail of similar form, besides which, my Father has also adapted gaff-top-sails between each mast. These sails produce an admirable effect when a ship is "on a wind," which is the kind of sailing most required among ice.

SECT. II.

Proceedings on board of a Greenland Ship, from putting to Sea to her Arrival on the Coast of Spitzbergen.

WHEN a ship is fully equipped, with at least the proportion of men, provisions, boats and stores, required by law for her tonnage, together with various other apparatus and appendages which experience has found to be useful or indispensable *; when the crew have been mustered † by the proper officer of the customs, and paid a month's wages in advance; and when the requisites of law with regard to bonds, certificates, oaths, &c. have been fulfilled, and the ship cleared out at the custom-house,—the first opportunity is embraced for putting to sea. This is generally accomplished in the course of the month of March, or at latest before the 10th of April.

The crew of a whale-ship usually consists of 40 to 50 men, comprising several classes of officers, such as harpooners, boat-steerers, line-managers, carpen-

* For a schedule of the extra stores, see Appendix No. III.

† For the manner of mustering the crew of whale ships, with some account of the affidavits, certificates, &c. required by law, see Appendix, No. IV.

ters, coopers, &c., together with fore-mast-men, landmen, and apprentices. As a stimulus to the crew in the fishery, every individual, from the master down to the boys, beside his monthly pay, receives either a gratuity for every size fish caught during the voyage, or a certain sum for every ton of oil which the cargo produces. Masters and harpooners, in place of monthly wages, receive a small sum in advance before sailing, and if they procure no cargo whatever, they receive nothing more for their voyage; but in the event of a successful fishing, their advantages are considerable. The master usually receives three guineas for each size fish, and as much for striking a size whale, or discovering a dead one, together with 10*s.* to 20*s.* *per* ton on oil, and commonly a thirtieth, a twenty-fifth, or a twentieth of the value of the cargo besides. He also has about 5*l.* *per* month for his attendance on the ship while he remains on shore. Each harpooner has usually 6*s.* *per* ton on oil, together with half-a-guinea for every size fish he may strike during the voyage. In addition to which, the chief-mate, who is generally also a harpooner, has commonly two guineas *per* month when at sea, and a guinea for each size fish. The specksioneer or chief harpooner, has also half-a-guinea *per* fish, and sometimes a trifle *per* ton of oil additional; and the second mate, and other officers, who serve in a compound capacity, have some additional monthly wages. Boat-steerers, line-managers, and

fore-mast men, commonly receive about 1*s.* 6*d.* *per* ton each, besides their monthly pay, and landmen either a trifle *per* ton on oil, or a few shillings for each size fish.

From the difference in the wages paid in different ports, it is not easy to say what is the amount of wages received by each class of officers belonging to the whale ships. In the general, however, it may be understood, that in a ship with 200 tons of oil, which is esteemed an excellent cargo, the chief mate receives about 95 *l.* for his voyage; a harpooner about 70 *l.*; and a common sailor, or foremast man, about 25 *l.*, including advance money and monthly pay. As the master's wages depend as much on the value of the cargo, as upon its quantity, it is difficult to give an opinion as to the amount: generally speaking, however, with a cargo of 200 tons of oil, he will receive about 250 *l.* to 300 *l.* when his pay is according to the lowest scale, and perhaps 500 *l.* or 600 *l.*, or upwards, when he is paid after the highest rate.

In time of war, the *manning* of the whale-ships at the ports where they were respectively fitted out, being sometimes impracticable, and always a matter of difficulty, it was usual for the owners and masters of such ships to avail themselves of the privilege allowed by act of Parliament, of completing their crews in Shetland and Orkney. These islands were therefore the frequent resort of most of the fishermen; those bound for Spitzbergen commonly

put into Shetland, and those for Davis' Straits into Orkney. But, in the present time of peace also, several ships, in consequence of the higher wages demanded by the English seamen, have availed themselves of a late extension of the act, for permitting a certain amount of extra men to be taken on board in Shetland, or Orkney, during the continuance of the bounty system. This privilege being originally intended to terminate with the war, it became an object of justice to the Shetland and Orkney people to extend it to peace also. Since these islanders had formerly furthered the interests of the fishers, and enabled them to send more ships than otherwise could have been manned, it was only reasonable that no obstruction at least, should be offered to prevent the fishers from repaying them for the accommodation they afforded in time of war, by continuing to employ them after the establishment of peace.

In Shetland, it is usual for the fishermen to *trim* their ships, and complete their ballast, by filling most of their empty casks with water, where it has not previously been done,—to replenish their fresh water,—to lay in stocks of eggs, fish, fowls, sea-sand, &c.,—to divest the ships of all elevated lumber, and gaudy appendages to the masts and rigging, by the way of preparing them for enduring the Polar storms, with greater safety and convenience,—and, lastly, to fix a "*crow's nest*," or "hurricane-house," on the mast of each ship,

and prepare a passage to it as safe and convenient as possible.

The *crow's nest* is an apparatus placed on the main-top-mast, or top-gallant-mast head, as a kind of watch-tower, for the use of the master, or officer of the watch, in the fishing seas, for sheltering him from the wind, when engaged in piloting the ship through crowded ice, or for obtaining a more extensive view of the sea around, when looking out for whales. When sailing amongst much heavy drift ice, as seen from the deck, it seems at a small distance impervious, although it may happen that scarcely any two pieces are connected; but, from the mast head, the relative position of almost every piece may be distinctly seen, and an opinion may be formed, by the experienced observer, of the probable and actual movements of such pieces as the ship is required to pass. This is an object of the greatest importance; because the varied movements of the different pieces, occasion such an alteration in the channel pursued, that were it not for a constant, attentive, and judicious watch by the master, or an able officer, a ship could not pass through any crowded collection of drift ice, without the imminent risk of being stove. Now, in difficult situations, a master's presence at the mast head, is sometimes required for many hours in succession, when the temperature of the air is from 10° to 20° below the freezing point, or more. It is therefore neces-

sary, for the preservation of his health, as well as his comfort, that he should be sheltered from the piercing gale *. A piece of canvas tied round the head of the main-top-mast, and heel of the top-gallant-mast, extending only from the cap to the cross trees, or at best a canvas stretched round the base of the top-gallant rigging, but open on the after part, was the most complete contrivance of a crow's nest, until a few years ago, when my Father invented an apparatus, having the appearance of a rostrum, which afforded an admirable defence against the wind. This contrivance, from the comfortable shelter it affords to the navigator, having come into very general use, it may not be improper to describe it more particularly. The one most approved by the inventor is about 4½ feet in length, and 2½ in diameter. The form is cylindrical; open above and close below. It is composed of laths of wood placed in a perpendicular position round the exterior edge of a strong wooden hoop, forming the top, and round a plane of mahogany, or other wood, which forms the bottom; and the whole circumference of the cylinder is covered with canvas or leather. The entrance is by a trap-hatch at the bottom. It is fixed on the very summit of the main-top-gallant-

* I have myself been seven hours at the mast head, without once descending; and have many times spent 10 or 12 hours of a day in the crow's nest.

mast, from whence the prospect on every side is unimpeded. On the after side is a seat, with a place beneath for a flag. In other parts are receptacles for a speaking trumpet, telescope, and occasionally for a *rifle piece* *, with utensils for loading. For the more effectual shelter of the observer, when in an erect posture, a moveable screen is applied to the top on the windward side, which increases the height so much as effectually to shield his head. When the ship is tacked, nothing more is necessary for retaining the complete shelter, than shifting the screen to the opposite side, which is done in an instant.

The Greenland ships usually leave Shetland towards the end of March or the beginning of April. From thence, if their view be to avail themselves of the benefit of the seal-fishery, they steer to the northward on the meridian, or a little to the westward, and commonly *make the ice* in the latitude of 70° to 72° north. But if the month of April be much advanced before they leave Shetland, they

* The rifle has been occasionally used for shooting narwhales: when fired at from the deck, it is almost impossible to kill them, partly on account of the resistance of the water, which the ball must pass through, and partly on account of the deception in their position, produced by the refractive property of the water. Shooting from the mast head nearly perpendicularly downwards, in a great measure obviates both these inconveniences.

generally steer for the whaling stations, on a course to the east of north, with the view of falling into that remarkable indentation of the Polar ice, lying in 5 or 10 degrees east longitude, which I have denominated the "Whale-fishers Bight." It used to be the practice to remain on sealing stations until the beginning of May, and not to enter the ice until about the middle of the month; but of late it has become usual to push into the ice at a much earlier period, though the practice is neither without its dangers nor disadvantages. If a barrier of ice prevents the fisher from reaching the usual fishing station, he sometimes perseveres in search of whales on the southward margin of the ice, but more generally endeavours to push through it into an opening, which is usually formed on the west side of Spitzbergen in the month of May, where he seldom fails of meeting with the objects of his search. It is a common remark, that the more difficulty there is attending the passage through the ice, the better is the fishery when that passage is accomplished. In *close* seasons, very few ships pass the barrier before the middle or end of May. Those which first succeed, immediately proceed along the edge of the western ice to the latitude of 78 or 79 degrees, or until they meet with whales. But in *open* seasons, the most commendable plan is to sail direct to the latitude of 80 degrees, when it can

be accomplished at a very early period, where large whales are generally at this season to be found.

SECT. III.

Observations on the Fishery of different Latitudes and Seasons, and under different circumstances of Ice, Wind, and Weather.

It is not yet ascertained, what is the earliest period of the year, in which it is possible to fish for whales. The danger attending the navigation, amidst massive drift ice in the obscurity of night, is the most formidable objection against attempting the fishery before the middle of the month of April, when the sun having entered the northern tropic, begins to enlighten the Polar regions throughout the twenty-four hours. Severity of frost, prevalence of storms, and frequency of thick weather, arising from snow and frost rime, are the usual concomitants of the spring of the year; and these, when combined with the darkness incident to night, a tempestuous sea, and crowded ice, must probably produce as high a degree of horror in the mind of the navigator, who is unhappily subjected to their distressful influence, as any combination of circumstances which the imagination can present.

Some ships have sailed to the northward of the seventy-eight degree of latitude, before the close of the month of March; but I am not acquainted with a single instance, where the hardy fishers have, at this season, derived any compensation for the extraordinary dangers to which they were exposed. In the course of the month of April, on certain occasions, considerable progress has been made in the fishery, notwithstanding the frequency of storms. At the first stage of the business, in *open* seasons, the whales are usually found in most abundance on the borders of the ice, near Hackluyt's Headland, in the latitude of 80°. A degree or two farther south, they are sometimes seen, though not in much plenty: but in the 76th degree, they sometimes occur in such numbers, as to present a tolerable prospect of success in assailing them. Some rare instances have occurred, wherein they have been seen on the edge of the ice extending from Cherry Island to Point-look-out, in the early part of the season.

In the year 1803, the fishery of April was considerable in the latitude of 80°; in 1813, many whales were seen near the same latitude; but the weather being tempestuous in an almost unprecedented degree, but few were killed; and in the intermediate years, the fishery was never general in this month, and but seldom begun at all before the commencement of May. In 1814, the fishery commenced before the middle of April, and some ships

derived uncommon advantage from an early arrival. In 1815, some ships were near Spitzbergen in March, and fished in the first week of April in the latitude of 80°, where a great number of whales were seen. Accompanying the ice in its drift along the coast to the southward, the same *tribe* of whales were seen in the latitude of 78°, about the middle and end of the month, and a considerable number were killed. In 1816, fish were seen in 80°, in the same month, but few killed, on account of the formation of bay ice upon the sea. In 1817, the weather was very tempestuous in April, and scarcely any whales were killed; and in 1818, the fishery of this month was inconsiderable.

Grown fish are frequently found at the edge, or a little within the edge of the loose ice, in the 79th degree of north latitude, in the month of May; and small whales of different ages at fields, and sometimes in bays of the ice in the 80th degree.

Usually, the fish are most plentiful in June; and on some occasions they are met with in every degree of latitude from 75° to 80°. In this month, the large whales are found in every variety of situation; sometimes in open water, at others in the loose ice, or at the edges of fields and floes, near the main impervious body of ice, extending towards the coast of *West* Greenland. The smaller animals of the species are, at the same time, found farther to

the south than in the spring, at floes, fields, or even among loose ice, but most plentifully about fields or floes, at the border of the main western ice, in the latitude of 78 or 78½ degrees.

In July, the fishery generally terminates, sometimes at the beginning of the month, at others, though more rarely, it continues throughout the greater part of it. Few small fish are seen at this season. The large whales, when plentiful, are found occasionally in every intermediate situation, between the open sea and the main ice, in one direction, and between the latitudes of 75° and 79° in the other, but rarely as far north as 80°.

The parallel of 78 to 78½ degrees, is, on the whole, the most productive fishing station. The interval between this parallel and 80°, or any other situation more remote, is called the "northward," and any situation in a lower latitude than 78°, is called the "southward."

Though the 79th degree affords whales in the greatest abundance, yet the 76th degree affords them, perhaps, more generally. In this latter situation, a very large kind of the mysticetus is commonly to be found throughout the season, from April to July inclusive. Their number, however, is not often great; and as the situation in which they occur is unsheltered, and, consequently, exposed to heavy swells, the southern fishery is not much frequented.

The parallel of 77° to 77½°, is considered a "dead latitude" by the fishers, but occasionally it affords whales also.

From an attentive observation of facts, it would appear, that different tribes of the mysticetus inhabit different regions, and pursue different routes on their removal from the places where first seen. These tribes seem to be distinguished by a difference of age or manners, and in some instances, apparently by a difference of species or sub-species. The whales seen in the spring in the latitude of 80°, which are usually full grown animals, disappear generally by the end of April; and the place of their retreat is unknown. Those inhabiting the regions of 78°, are of a mixed size. Such as resort to fields in May and beginning of June, are generally young animals; and those seen in the latitude of 76°, are almost always of the very largest kind. Instances are remembered by some aged captains, wherein a number have been taken in the *southward* fishing stations, which were astonishingly productive of oil. It is probable, that the difference in the appearance of the heads, or the difference of proportion existing between the heads and bodies of some mysticete, are distinguishable of a difference in the species, or sub-species. Those inhabiting southern latitudes, have commonly long heads and bodies, compared with their circumference, moderately thick blubber and long whalebone; those of

the mean fishing latitude, that is 78°,–79°, have more commonly short broad heads, compared with the size of the body. In some individuals, the head is at least one-third of the whole length of the animal, but in others scarcely two-sevenths. Hence, it is exceedingly probable, that the whales seen early in April, in the latitude of 80°, are a peculiar tribe, which do not re-appear during the remainder of the season; and that those inhabiting the latitude of 78° and of 76°, are likewise distinct tribes.

Notwithstanding, if we descend to particulars, the great variety and uncertainty which appear in the nature of the situations preferred by the whales, and the apparent dissimilarity observed in their habits,—it is probable, that were the different tribes distinguished, we should find a much greater degree of similarity in their choice of situation and in their general habits, than we are at present able to trace.

Annoyed as the whales are by the fishers, it is not surprising that they sometimes vary their usual places of resort; and it is not improbable, were they left undisturbed for a few years, but that they might return to the bays and sea-coasts of Spitzbergen and its neighbouring islands, as was formerly the custom with certain tribes, at the commencement of this fishery. We are doubtless, in a great measure, indebted to the necessity they are under, of performing the function of respiration in the air, at

stated intervals, for being able to meet with them at all; though the coast of Spitzbergen may possibly possess a powerful attraction to the mysticete, by affording them a greater abundance of palatable food than the interior western waters, covered perpetually by the ice. From this necessity of respiring in the air, we may account for their appearance in the open sea in the early part of the spring. The ice at this season, connected by the winter's frost, is probably so consolidated, as to prevent the whales from breathing among it, excepting within so much of its confines as may be broken by the violence of the sea in storms. After the dissolution of the continuity of the ice, by north, north-west, or west winds, they find sufficient convenience for respiration in the interior, and often retreat thither to the great disadvantage of the whalers. In such cases, if the formation of bay ice, or the continuity of the border of the heavy ice, prevents the ships from following, the whales completely escape their enemies, until the relaxation of the frost permits an entrance.

It is not uncommon, however, for an adult tribe of whales to resort partially to the open sea, between the latitudes of 76° and 79°, during the months of May and June, and though more rarely, during the early part of July, when, at length, they suddenly betake themselves to the ice and disappear altogether.

The systematical movements of the whales receive additional illustration from many well known facts. Sometimes a large tribe passing from one place to another, which, under such circumstances, is denominated a "run of fish," has been traced in its movements, in a direct line from the south towards the north, along the seaward edge of the western ice, through a space of two or three degrees of latitude; then it has been ascertained to have entered the ice, and penetrated to the north-westward, beyond the reach of the fishers. In certain years, it is curious to observe, that the whales commence a simultaneous retreat throughout the whole fishing limits, and all disappear within the space of a very few days. On such occasions, it has often happened, that not a single whale has been seen by any individual belonging to the whole Greenland fleet, after, perhaps, the middle of June, but more commonly after the first or second week in July, notwithstanding many of the fleet may have cruised about in the fishing regions for a month afterwards. In the year 1813, whales were found in considerable numbers in the open sea, during the greater part of the fishing season, but in the greatest abundance about the end of June and beginning of July. On the 6th of July they departed into the ice, and were followed by the fishers; several were killed during the three succeeding days, but they wholly disappeared after the 9th. Notwithstanding, seve-

ral ships cruised " the country" for some weeks afterwards, in all navigable directions through an extent of four degrees of latitude, and penetrated the ice as far as the main western body, in different parallels, it does not appear that a single whale was caught, and, as far as I was able to learn, but one was seen, and this individual was observed to be rapidly advancing towards the north-west. I do not mention this as an uncommon circumstance, because a similar case occurs frequently, but as a single illustration of the foregoing observation.

When the fishery for the season, in the opinion of the British whalers, has altogether ceased, it appears from the observations of the Dutch *, that it may frequently be recommenced in the autumn, at the verge of the most northern waters, near Hackluyt's Headland. They consider the fish which then appear as the same tribe that are seen in this place in the spring of the year, and enter the ice immediately after it opens in the north. On the recommencement of the frost, they instinctively return, to prevent themselves being enclosed so far within the ice, as to occasion suffocation from the freezing up of the openings through which they might otherwise breathe. In consequence of this, together with the dangers attending the northern fishery in the spring, the Dutch appear to have generally prefer-

* Beschryving, &c. vol. i. p. 52.

red the fishery of high northern latitudes in the autumn, as a considerable degree of success was reasonably expected from it at this season, without the same risk of getting their ships beset as they are exposed to in the spring. The many calamities which have occurred to the Hollanders, from their ships getting beset, occasioned an excessive dread of the ice in high latitudes. Such of their ships as happened to get enclosed by the ice under unfavourable circumstances, not only failed altogether in the fishery, but not unfrequently accompanied the ice in its drift by the course of the south-westerly current, and remained beset until the approach of winter. In some instances, they were obliged to winter in the Polar regions, and on several occasions their ships were wrecked, and many, if not all, of their crews perished under the most afflicting circumstances. In modern times, these events are more rare, notwithstanding the increased perseverance of the fishers among the ice. This may be attributed to the extraordinary exertions of skill and personal labour, which they now make use of, for accomplishing their release, whenever they find themselves unhappily enclosed in such situations as threaten them with permanent detention, or their ships with destruction. The means in common use for securing the safety of their ships, are likewise ingenious. They seek the most protected situation, keep an anxious watch, and remove their ships,

when it can be accomplished, on the first approach of danger; but if unable to move about, they cut canals or docks in the solid ice, into which they push their ships, and generally preserve them in safety.

That tribe of whales above mentioned, which are seen in the spring and autumn of the year near Hackluyt's Headland, are supposed by the Dutch to be really inhabitants of the sea adjoining West Greenland; that they always retreat thither whenever the state of the ice will admit, and only appear within the observance of the fishers, when the solidity of the ice prevents their attaining those favourite situations, where they probably find the most agreeable food *.

The whales of lower latitudes, however, whose food lies near the eastern margin of the main ice, when they enter the ice in May and June, seem to exhibit an intention of evading their pursuers; for in whatever manner they may retreat for a while, they frequently return to the same or other similar place accessible to the fishers. But after the month of July, this tribe also penetrates so deeply into the ice, that it gets beyond the reach of its enemies.

Ships, when drifted along with the ice to the south-west, until they lose sight of the whales, en-

* Beschryving, &c. vol. i. p. 53.—As I have never seen whales in this situation in the autumn myself, I give the information entirely on the authority of the work here quoted.

deavour to make their escape into the eastern sea, and resume the fishery again in a higher latitude.

There have been occasions in which whales have been seen and killed in the latitude of 71° or 72°, but the circumstances were peculiar, and the instances rare.

Having now mentioned, generally, the principal places resorted to by the whales in the Spitzbergen seas, it will possibly be interesting to such as are in any way concerned in the fishery, to notice more particularly their favourite haunts, under particular circumstances.

Experience proves, that the whale has its favourite places of resort, depending on a sufficiency of food, particular circumstances of weather, and particular positions and qualities of the ice. Thus, though many whales may have been seen in open water, when the weather was fine, after the occurrence of a storm, perhaps not one is to be seen. And, though fields are sometimes the resort of hundreds of whales, yet, whenever the loose ice around separates entirely away, the whales quit them also. Hence fields seldom afford whales in much abundance, excepting at the time when they first "break out," and become accessible; that is, immediately after a vacancy is made on some side by the separation of adjoining fields, floes or drift ice. Whales, on leaving fields which have become exposed, frequently retire to

other more obscure situations in a west or north-west direction; but occasionally they retreat no further than the neighbouring drift ice, from whence they sometimes return to the fields at regular intervals of six, twelve, or twenty-four hours. It is a remark of my Father's, which may be useful to the fisher, that in penetrating from the sea towards the edge of a field in search of whales, seldom will any be found, unless some individuals are seen in the passage through the intervening loose ice.

Whales are rarely seen in abundance in the large open spaces of water, which sometimes occur amidst fields and floes, nor are they commonly seen in a very open pack, unless it be in the immediate neighbourhood of the main western ice. They seem to have a preference for close packs and patches of ice, and for fields under certain circumstances; for deep bays or *bights*, and sometimes for clear water situations; occasionally for detached streams of drift ice; and most generally, for extensive sheets of bay ice. Bay ice is a very favourite retreat of the whales, so long as it continues sufficiently tender, to be conveniently broken, for the purpose of respiration. In such situations, whales may frequently be seen in amazing numbers, elevating and breaking the ice with their *crowns* *, where they are observed to

* The eminence on the head of the whale, in which the blow-holes are situated, is thus called.

remain much longer at rest than when seen in open water, or in the clear interstices of the ice, or indeed in almost any other situation.

The most favourable opportunity for prosecuting the fishery, commonly occurs with north, north-west, or west winds. At such times, the sea near the ice is almost always smooth, and the atmosphere, though cloudy and dark, is generally free from fog or thick snow. The fishers prefer a cloudy to a clear sky; because, in very bright weather, the sea becomes illuminated, and the shadow of the whale-boats are so deeply impressed in the water by the beams of the sun, that the whales are very apt to take the alarm, and evade the utmost care and skill of their pursuers. The severe frost with which these winds are sometimes accompanied, is the principal inconvenience attending them. South-east or east winds, though of themselves disagreeable, on account of the thick weather with which they are in general accompanied, and exceedingly dangerous, from the high swells which they often occasion, when they are boisterous, —have nevertheless their advantages. They crowd the drift ice closely together, cause a violent agitation among the pieces, and by these circumstances either drift the ice away from the places occupied by the whales, or so annoy them as to induce them to leave their retreat and appear in the open sea.

The nature of the circumstances most favourable for fishing, will be readily understood, when it is

observed, that the fishery most particularly requires a cloudy atmosphere, yet free from fog or continued snow; smooth water, with a breeze of wind; and navigably open, or perfectly solid ice.

Calms are unfavourable for fishing. The stillness which then prevails gives the whale a great advantage in avoiding danger, by the distinct use of its hearing and sight; so that it is difficult for a boat to approach within the distance to which a harpoon can be thrown, before the fish takes the alarm, and escapes. In a brisk breeze, on the contrary, where the surface of the water is rough with "wind lipper," both the sight and hearing of the whale must be very indistinct.

SECT. IV.

Description of the Boats and Principal Instruments used in the Capture of the Whale.

WHALE-BOATS are, of course, peculiarly adapted for the occupation they are intended to be employed in. A well constructed "Greenland boat," possesses the following properties. It floats lightly and safely on the water,—is capable of being rowed with great speed, and readily turned round,—it is of such capacity that it carries six or seven men, seven or eight hundred weight of whale-lines, and

various other materials, and yet retains the necessary properties of safety, buoyancy, and speed, either in smooth water, or where it is exposed to a considerable sea. Whale-boats being very liable to receive damage, both from whales and ice, are always *carver-built*,—a structure which is easily repaired. They are usually of the following dimensions. Those called "Six oared boats," adapted for carrying seven men, six of whom, including the harpooner, are rowers, are generally 26 to 28 feet in length, and about 5 feet 9 inches in breadth. Six men boats, that is, with five rowers and a steersman, are usually 25 to 26 feet in length, and about 5 feet 6 inches in breadth. And "four oared boats," are usually 23 to 24 feet in length, and about 5 feet 3 inches in breadth. The main breadth of the two first classes of boats, is at about three-sevenths of the length of the boat reckoned from the stem; but, in the last class, it is necessary to have the main breadth within one-third of the length of the boat from the stem. The object of this is, to enable the smaller boat to support, without being dragged under water, as great a strain on the lines as those of a larger class; otherwise, if such a boat were sent out by itself, its lines would be always liable to be lost, before any assistance could reach it. The five oared or six men boat, is that which is in most general use; though each fishing ship generally carries one or two of the largest class. These boats

are now commonly built of fir-boards, one-half or three-fourths of an inch thick, with timbers, keel, gunwales, stem, and stern-post of oak. An improvement in the timbering of whale-boats has lately been made, by sawing the timber out of very straight grained oak, and bending them to the required form, after being made supple, by the application of steam, or immersion in boiling water. This improvement, which renders the timbers more elastic, than when they are sawn out of crooked oak, and at the same time makes the boat stronger and lighter, was suggested by Thomas Brodrick, Esq. of Whitby, ship-builder. Though the principle has long been acted upon in clincher-built boats, with ash timbers, the application to carver-built whale-boats, is, I believe, new. The bow and stern of Greenland boats, are both sharp, and, in appearance, very similar; but the stern forms a more acute angle than the bow. The keel has some inches depression in the middle, from which the facility of turning is acquired.

The instruments of general use in the capture of the whale, are the harpoon and lance.

The harpoon (plate 18. fig. 2.) is an instrument of iron, of about three feet in length. It consists of three conjoined parts, called the "socket," "shank," and "mouth;" the latter of which includes the barbs or "withers." This instrument, if we except a small addition to the barbs, and some enlargement of dimensions, maintains the same form in which it

was originally used in the fishery two centuries ago. At that time, the mouth or barbed extremity was of a triangular shape, united to the shank in the middle of one of the sides; and this being scooped out on each side of the shank, formed two simple flat barbs. In the course of last century, an improvement was made, by adding another small barb, resembling the beard of a fish-hook, within each of the former withers, in a reverse position. The two principal withers, in the present improved harpoon, measure about 8 inches in length and 6 in breadth; the shank is 18 inches to 2 feet in length, and $\frac{4}{10}$ths of an inch in diameter; and the socket, which is hollow, swells from the size of the shank to near 2 inches diameter, and is about 6 inches in length. Now, when the harpoon is forced by a blow into the fat of the whale, and the line is held tight, the principal withers seize the strong ligamentous fibres of the blubber, and prevent it from being withdrawn; and in the event of its being pulled out, so far as to remain entangled by one wither only, which is frequently the case, then the little reverse barb, or "stop wither" as it is called, collecting a number of the same reticulated sinewy fibres, which are very numerous near the skin, prevents the harpoon from being shaken out by the ordinary motions of the whale. The point and exterior edges of the barbs of the harpoon, are sharpened to a rough edge, by means of a file. This part of the harpoon is not formed of

steel, as it is frequently represented, but of common soft iron; so that when blunted, it can be readily sharpened by a file, or even by scraping it with a knife. The most important part in the construction of this instrument, is the shank. As this part is liable to be forcibly and suddenly extended, twisted and bent, it requires to be made of the softest and most pliable iron. That kind which is of the most approved tenacity, is made of old horse-shoe nails or *stubs*, which are formed into small rods, and two or three of these welded together; so that should a flaw happen to occur in any one of the rods, the strength of the whole might still be depended on. Some manufacturers enclose a quantity of stub-iron in a cylinder of best foreign iron, and form the shank of the harpoon out of a single rod. A test sometimes used for trying the sufficiency of a harpoon, is to wind its shank round a bolt of inch iron, in the form of a close spiral, then to unwind it again, and put it into a straight form. If it bears this without injury in the *cold* state, it is considered as excellent. The breaking of a harpoon is of no less importance than the value of a whale, which is sometimes estimated at more than a 1000 *l.* Sterling. This consideration has induced many ingenious persons to turn their attention towards improving the construction and security of this instrument: but though various alterations have been suggested,

such as forming the shank of plies of wire, adding one or two lateral barbs, &c. &c. they have all given place to the simplicity of the ancient harpoon.

A harpoon was recently produced in Hull, the design of which was to prevent the loss of a whale, provided the shank of the instrument should happen to break. To effect this, the thick part of the shank immediately adjoining the mouth of the harpoon, was pierced with an oblong hole, in the direction of the plane of the withers. Through this hole a small rope, or a *strand* of whale line, is passed, and both ends secured to the line attached to the other end of the harpoon. Hence, should the shank of the harpoon break, the connection between the line and the part of the harpoon fixed in the whale is still preserved; and the connecting material is of such a strength, as to be, in ordinary circumstances, sufficient for completing the capture. The safety rope is no hinderance to the entrance of the harpoon into the whale, as it serves to increase the breadth of the shank only, and not its thickness; nor is there any great risk of the shank breaking in the part which is pierced, its strength being very great. This contrivance, on the whole, appears to be calculated for effecting, in a considerable degree, the desirable purpose for which it is intended.

I have been thus particular in the description of the harpoon, because it is an instrument of greater consequence than any other used in the fishery.

Next in importance to the harpoon is the lance, (Pl. 18. fig. 6.*) which is a spear of iron of the length of 6 feet. It consists of a hollow socket 6 inches long, swelling from half an inch, the size of the shank, to near 2 inches in diameter, into which is fitted a 4 feet stock or handle of fir; a shank 5 feet long, and half an inch in diameter; and a mouth of steel, which is made very thin, and exceedingly sharp, 7 or 8 inches in length, and 2 or $2\frac{1}{2}$ in breadth.

These two instruments, the harpoon and lance, with the necessary apparatus of lines, boats and oars, are all that are essential for capturing the whale. But besides these instruments, so successfully used in the whale-fishery, there is likewise an auxiliary weapon which has, at different periods, been of some celebrity. This is the harpoon-gun. It is well calculated to facilitate the capture of whales, under particular circumstances, particularly in calm clear weather, when the fish are apt to take the alarm, whenever the boats approach within fifteen or twenty yards of them. The harpoon-gun was invented in the year 1731, and used, it seems, by some individuals with success. Being, however, difficult, and somewhat dangerous in its application, it was laid aside for many years. In 1771 or 1772,

* I have given three figures of lances, (fig. 4, 5, 6,) of which I prefer No. 6.

a new one was produced to the Society of Arts, which differed so materially from the instrument before in use, that it was received as an original invention. This society took a great interest in promoting its introduction, and with some difficulty and great expence effected it. Between 1772 and 1792, the Society of arts gave in premiums to whale-fishers, and to artisans for improvements in the gun and harpoon, the sum of 350 *l.* or 400 *l.* In one year only, (1791,) they paid 36 guineas as premiums, to twelve persons, who had been successful in the use of the harpoon-gun. Since the year 1792, they have generally been in the habit of offering a premium of 10 guineas, to the harpooner who should shoot the greatest number of whales in one season, not being less than three. This premium, however, though it has been frequently offered, has been seldom claimed. The harpoon-gun has been highly improved, and rendered capable of throwing a harpoon near forty yards with effect; yet, on account of the difficulty and address requisite in the management of it, and the loss of fish, which, in unskilful hands, it has been the means of occasioning, together with some accidents which have resulted from its use,—it has not been so generally adopted as might have been expected.

In its present improved form, as made by Mr Wallis, gun-smith, Hull, the harpoon-gun consists of a kind of swivel, having a barrel of

wrought iron, 24 to 26 inches in length, of 3 inches exterior diameter, and $1\frac{7}{8}$ inches bore. It is furnished with two locks, which act simultaneously, for the purpose of diminishing the liability of the gun missing fire. In plate 19., is a representation of the harpoon-gun; and fig. 1. and 3. of Pl. 18., show the form of the harpoon which is fired from it. The shank of this harpoon is double, terminating in a cylindrical knob, fitting the bore of the gun. Between the two parts of the shank is a wire ring, to which is attached the line. Now, when the harpoon is introduced into the barrel of the gun, the ring, with the attached line, remains on the outside, near the mouth of the harpoon; but the instant that it is fired, the ring flies back against the cylindrical knob. Some harpoons have been lately made with a single shank, similar to the common "hand-harpoon," but swelled at the end to the thickness of the bore of the gun. The whale line, which is closely spliced round the shank, is slipped towards the mouth of the harpoon, when it is placed in the gun, and when fired, is prevented from disengaging itself, by the size of the knob at the end.

SECT. V.

Preparations for the Fishery.

On the first convenient opportunity after a ship arrives on the usual fishing-stations, preparations for attacking the whale are made. Previous to the sailing of the ship from her port, the principal articles requisite for this service are provided, and in the course of the outward passage, the different utensils are fitted for immediate use. Among numerous preparations carried on by the mechanics and seamen of the ship, most of which are void of interest to general readers, the operation of "spanning harpoons" will alone be noticed.

A piece of rope made of the best hemp, called a "Foreganger," about $2\frac{1}{4}$ inches in circumference, and eight or nine yards in length, is spliced closely round the shank of the harpoon, the swelled socket of which prevents the eye of the *splice* from being drawn off. A stock or handle, six or seven feet in length, is then fitted into the socket, and fastened in its place through the medium of the foreganger. The fastening of the stock is sufficient only for retaining it firm in its situation during the discharge of the weapon, but is liable to be disengaged soon afterwards; on which the harpoon, relieved from the shake and twist of this no longer necessary appendage, main-

tains its hold with better effect. After the stock drops out, it is seldom lost, but still hangs on the line by means of a loop of cord fixed openly round it, for the purpose of preventing the stock from floating away. The foreganger is most commonly formed of white or untarred rope, which is stronger and more flexible than tarred rope, consequently more easily extended when the harpoon is thrown. Every harpoon is stamped with the name of the ship to which it belongs; and when prepared for use, a private *mark*, containing the name of the ship and master, with the date of the year, written upon leather, is concealed beneath some rope-yarns wound round the socket of the instrument, and the same is sometimes introduced also into the foreganger. These marks serve to identify the harpoons when any dispute happens to arise relative to the claims of different ships to the same fish, and have sometimes proved of essential service, in deciding cases which might otherwise have extended to vexatious litigation. A harpoon thus prepared with foreganger and stock, is said to be "spanned in." In this state, the point or mouth being very clean and sharp, is preserved in the same condition by a shield of oiled paper or canvas; and the instrument, with its appendages, laid up in a convenient place, ready for being attached to the whale-lines in a boat when wanted.

The principal preparations for commencing the fishery, are included in the "fitting of the boats." In this work, all the people belonging to the ship are employed. The boats are first cleared of all lumber, and then the whale-lines, each consisting of 120 fathoms of rope, about $2\frac{1}{4}$ inches in circumference, are spliced to each other, to the amount of about six for each boat, the united length of which is about 720 fathoms, or 4320 feet; and the whole carefully and beautifully coiled in compartments in the boat, prepared for the purpose. A portion of five or six fathoms of the line first put into the boat called the "stray-line," is left uncovered, by that which follows, and coiled by itself in a small compartment at the stern of the boat: it is furnished with a loop or "eye," for the facility of connecting the lines of one boat with those of another. To the upper end of the line is spliced the foreganger of a spanned harpoon, thus connecting the harpoon with all the lines in the boat *.

Every boat completely fitted, is furnished with two harpoons, (one spare), six or eight lances, and five to seven oars, together with the following instruments and apparatus. A "jack" or flag fas-

* Whale-lines are always made of the best materials, and manufactured with extraordinary care. As such they are usually charged 20*s.* or 30*s.* *per* cwt. more than other cordage.

tened to a pole, intended to be displayed as a signal whenever a whale is harpooned; a "tail-knife," (Pl. 20. fig. 4.) used for perforating the fins or tail of a dead whale; a "mik," or rest, (fig. 7.), made of wood, for supporting the stock of the harpoon when ready for instant service; an "axe", (fig. 16.) for cutting the lines when necessary; a "pigging" or small bucket, for bailing the boat, or wetting the running lines, to prevent the bollard from taking fire; a "snatch-block," (fig. 17.); "a grapnel," (fig. 11.); two "boat-hooks;" a "fid," a wooden "mallet," and "snow-shovel;" also a small broom and a "swab," together with spare tholes, grommets, &c. In addition to these, the two six-oared or other swiftest boats, are likewise furnished with an apparatus called a "winch," (Pl. 19. fig. 2.), for heaving the lines into the boat after the fish is either killed or has made its escape; and in some ships they also carry a harpoon-gun, with apparatus for loading. The whole of the articles above enumerated, are disposed in convenient places throughout the boat. The axe is always placed within the reach of the harpooner, who, in case of an accident, can cut the line in an instant; the harpoon-gun is fixed by its swivel to the boat's stem; the lances are laid in the sides of the boat upon the thwarts; the hand-harpoon is placed upon the mik or rest with its stock, and on the bow of the boat with its point, and the foreganger is

clearly coiled beneath it, so that the harpoon can be taken up and discharged in a moment. The oars used for rowing the Greenland boats, are about 16 feet in length, and those used for steering are 18 or 20 feet. All the oars are fixed by rope-grommets to a single thole, so that when not in use, they can be readily unshipped or pushed out of the boat through the grommet, as far as a stop on the extremity of each oar will admit, and then left to float parallel with the sides of the boat. An oar is used for steering in preference to a rudder, in consequence of its possessing many advantages: An oar does not retard the velocity of the boat so much as a rudder; it is capable of turning the boat when in a state of rest, and more readily than a rudder when in motion; and it can be used for propelling the boat, in narrow places of the ice where the rowers cannot ply their oars, by the process of sculling, and in calms for approaching a whale without noise, by the same operation.

The crew of a whale ship are separated into divisions, equal in number to the number of the boats. Each division, consisting of a harpooner, a boat-steerer, and a line-manager, together with three or four rowers, constitutes "a boat's crew."

The harpooner's principal office is, as his name implies, to strike the whale, also to guide the lines, or to kill an entangled whale with his lances. When in pursuit, he rows the bow-oar. He has

the command of the boat. When on board of the ship, he has different occupations, according to the nature of the operations which are going on.

The boat-steerer, who ranks next to the harpooner. At the same time that he guides the course of the boat in the most favourable direction, likewise watches the motions of the whale pursued,—intimates its movements to the harpooner,—and stimulates the crew to exertion by encouraging exclamations. The line-manager rows the "after oar" in the boat, and, conjointly with the boat-steerer, attends to the lines, when in the act of running out, or coiling in. The remainder of the crew of the boat is composed of seamen, or others, whose chief qualification consists in their capability of "pulling an oar."

Besides the division of the seamen of a whaler into boats' crews, they are likewise classed, as in other vessels, into watches. A *watch* is a certain proportion of the ship's crew, generally a third, or a half, who, when at sea, are on duty, while the others rest. When in thirds, each watch consists of two boats' crews, with an equal share of those men constituting the crews of what may be called extra boats, or the excess above six. This division is usually, but very improperly, called "the quarter watch." In this kind of arrangement, which is only adopted on the passages, or in the fishing country, when no whales are seen, nor any particular business going on, each man watches four hours, and

rests eight. But when whales are astir, the crew is usually divided into two parties, called " the half watch," in which every man watches and rests four hours alternately.

In the one-third watch, the chief-mate, specksioneer, and second-mate, who are usually the three principal harpooners, have the charge of the three watches, though the one under the second-mate is called the Captain's Watch. When any of these principal officers are in the boats, the under harpooners take charge of the watches.

SECT. VI.

Proceedings on Fishing Stations.

On fishing stations, when the weather is such as to render the fishery practicable, the boats are always ready for instant service. Suspended from davits or cranes, by the sides of the ship, and furnished with stores, as before enumerated, two boats at least, the crews of which are always in readiness, can, in a general way, be manned and lowered into the water, within the space of one minute of time.

Wherever there is a probability of seeing whales, when the weather and situation are such as to present a possibility of capturing them, the crow's nest

is generally occupied by the master, or some one of the officers, who, commanding from thence, an extensive prospect of the surrounding sea, keeps an anxious watch for the appearance of a whale. Assisted by a telescope, he views the operations of any ship which may be in sight at a distance; and occasionally sweeps the horizon with his glass, to extend the limited sphere of vision in which he is able to discriminate a whale with the naked eye, to an area vastly greater. The moment that a fish is seen, he gives notice to the "watch upon deck," part of whom leap into a boat, are lowered down, and push off towards the place. If the fish be large, a second boat is immediately dispatched to the support of the other. When the whale again appears, the two boats row towards it with their utmost speed; and though they may be disappointed in all their attempts, they generally continue the pursuit, until the fish either takes the alarm, and escapes them, or they are recalled by signal to the ship. When two or more fish appear at the same time, in different situations, the number of boats sent in pursuit, is commonly increased; and when the whole of the boats are sent out, the ship is said to have "a loose fall."

During fine weather, in situations where whales are seen, or where they have recently been seen, or where there is a great probability of any making their appearance, a boat is generally kept in readi-

ness, manned and afloat. If the ship sails with considerable velocity, this boat is towed by a rope, astern; but when the ship is pretty still, whether moored to ice, laid too, or sailing in light winds, the "bran-boat," as it is called, often pushes off to a little distance from the ship. A boat on watch, commonly lies still in some eligible situation, with all its oars elevated out of the water, but in readiness, in the hands of the rowers, for immediate use. The harpooner and boat-steerer keep a careful watch on all sides, while each of the rowers looks out in the direction of his oar. In field-fishing, the boats approach the ice with their sterns, and are each of them fastened to it by means of a boat-hook, or an iron spike with a cord attached, either of which is held by the boat-steerer, and is slipped or withdrawn the moment a whale appears. There are several rules observed in approaching a whale, as precautions, to prevent, as far as possible, the animal from taking the alarm. As the whale is dull of hearing, but quick of sight, the boat-steerer always endeavours to get behind it; and, in accomplishing this, he is sometimes justified in taking a circuitous route. In calm weather, where guns are not used, the greatest caution is necessary before a whale can be reached; smooth careful rowing is always requisite, and sometimes sculling is practised.

When it is known that a whale seldom abides longer on the surface of the water than two minutes,—that it generally remains from five to ten or fifteen minutes under water *,—that in this interval it sometimes moves through the space of half a mile, or more,—and that the fisher has very rarely any certain intimation of the place in which it will re-appear;—the difficulty and address requisite to approach sufficiently near during its short stay on the surface, to harpoon it, will be readily appreciated. It is therefore a primary consideration with the harpooner, always to place his boat as near as possible to the spot in which he expects the fish to rise, and he conceives himself successful in the attempt when the fish "comes up within a start;" that is, within the distance of about 200 yards. In all cases where a whale that is pursued has but once been seen, the fisher is considerably indebted to what is called chance for a favourable position. But when the whale has been twice seen, and its change of place, if any, noticed, the harpooner makes the best use of the intimation derived from his observations on its apparent motion, and places his boat accordingly; thus, he anticipates the fish in its progress, so that when it rises to the surface, there

* Before I had particularly minuted the time that a whale stays on the surface, and remains below, I believed each interval, and especially the former, was much greater than it really is.

is a probability of its being within the favourable precincts of a start.

A whale moving forward at a small distance beneath the surface of the sea, leaves a sure indication of its situation, in what is called an "eddy," having somewhat the resemblance of the "wake" or track of a ship; and in fine calm weather, its change of position is sometimes pointed out by the birds, many of which closely follow it when at the surface, and hover over it when below, whose keener vision can discover it, when it is totally concealed from human eyes. By these indications, many whales have been taken.

SECT. VII.

Proceedings in capturing the Whale.

THE Providence of GOD is manifested in the tameness and timidity of many of the largest inhabitants of the earth and sea, whereby they fall victims to the prowess of man, and are rendered subservient to his convenience in life. And this was the design of the lower animals in their creation. GOD, when he made man, having given him "dominion over the fish of the sea, and over the fowl of the air, and over every living thing that

moveth upon the earth*." The holy Psalmist, when considering the power and goodness of GOD in the Creation, exclaims, "What is man that thou art mindful of him? and the son of man that thou visitest him?" And, in contemplation of the "glory and honour" put upon man by the Almighty, in the power given him over created nature, he adds, "Thou madest him to have dominion over the works of thy hands: thou hast put all things under his feet."—"The fowl of the air, and the fish of the sea, and whatsoever passeth through the paths of the seas. O Lord, our Lord, How excellent is thy name in all the earth†?"

Hence, while we admire the cool and determined intrepidity of those who successfully encounter the huge mysticetus, if we are led to reflect on the source of the power by which the strength of men is rendered effectual for the mighty undertaking; our reflections must lead us to the "Great first Cause," as the only source from whence such power could be derived.

Whenever a whale lies on the surface of the water, unconscious of the approach of its enemies, the hardy fisher rows directly upon it; and an instant before the boat touches it, buries his harpoon

* HOLY BIBLE, book of *Gen.* chap. i. ver. 26. & 28.

† Idem, 8th *Psalm.*

in its back. But if, while the boat is yet at a little distance, the whale should indicate his intention of diving, by lifting his head above its common level and then plunging it under water, and raising his body, until it appear like the large segment of a sphere,—the harpoon is thrown from the hand, or fired from a gun, the former of which, when skilfully practised, is efficient at the distance of eight or ten yards, and the latter at the distance of thirty yards, or upward. The wounded whale, in the surprise and agony of the moment, makes a convulsive effort to escape. Then is the moment of danger. The boat is subjected to the most violent blows from its head, or its fins, but particularly from its ponderous tail, which sometimes sweeps the air with such tremendous fury, that both boat and men are exposed to one common destruction.

The head of the whale is avoided, because it cannot be penetrated with the harpoon; but any part of the body, between the head and the tail, will admit of the full length of the instrument, without danger of obstruction. The harpoon, therefore, is always struck into the back, and generally well forward towards the fins, thus affording the chance, when it happens to drag and plough along the back, of retaining its hold during a longer time than when struck in closer to the tail.

The moment that the wounded whale disappears, or leaves the boat, a jack or flag, elevated on a staff, is displayed; on sight of which, those on watch in the ship, give the alarm, by stamping on the deck, accompanied by a simultaneous and continued shout of "a fall *." At the sound of this, the sleeping crew are roused, jump from their beds, rush upon deck, with their clothes tied by a string in their hands, and crowd into the boats. With a temperature of Zero, should a *fall* occur, the crew would appear upon deck, shielded only by their drawers, stockings, and shirts, or other habiliments in which they sleep. They generally contrive to dress themselves, in part at least, as the boats are *lowered* down; but sometimes they push off in the state in which they rise from their beds, row away towards the "fast boat," and have no opportunity of clothing themselves for a length of time afterwards. The alarum of "a fall," has a singular effect on the feelings of a sleeping person, unaccustomed to the whale-fishing business. It has often been mistaken as a cry of distress. A landsman, in a Hull ship, seeing the crew, on an occasion of a fall, rush upon deck,

* The word *fall*, as well as many others used in the fishery, is derived from the Dutch language. In the original it is written *val*, implying jump, drop, fall, and is considered as expressive of the conduct of the sailors, when *manning* the boats on an occasion requiring extreme dispatch.

with their clothes in their hands, and leap into the boats, when there was no appearance of danger, thought the men were all mad; but, with another individual, the effect was totally different. Alarmed with the extraordinary noise; and still more so, when he reached the deck, with the appearance of all the crew seated in the boats in their shirts, he imagined the ship was sinking. He therefore endeavoured to get into a boat himself, but every one of them being fully manned, he was always repulsed. After several fruitless endeavours to gain a place among his comrades, he cried out, with feelings of evident distress, "What shall I do?—Will none of you take me in?"

The first effort of a "fast-fish," or whale that has been struck, is to escape from the boat, by sinking under water. After this, it pursues its course directly downward, or re-appears at a little distance, and swims with great celerity, near the surface of the water, towards any neighbouring ice, among which it may obtain an imaginary shelter; or it returns instantly to the surface, and gives evidence of its agony, by the most convulsive throes, in which its fins and tail are alternately displayed in the air, and dashed into the water with tremendous violence. The former behaviour, however, that is, to dive towards the bottom of the sea, is so frequent, in comparison of any other, that it may be considered as the general conduct of a fast-fish.

A whale, struck near the edge of any large sheet of ice, and passing underneath it, will sometimes run the whole of the lines out of one boat, in the space of eight or ten minutes of time. This being the case, when the "fast-boat" is at a distance, both from the ship and from any other boat, it frequently happens that the lines are all withdrawn before assistance arrives, and, with the fish, entirely lost. In some cases, however, they are recovered. To retard, therefore, as much as possible, the flight of the whale, it is usual for the harpooner, who strikes it, to cast one, two, or more turns of the line round a kind of post called a *bollard*; which is fixed within ten or twelve inches of the stem of the boat, for the purpose. Such is the friction of the line, when running round the bollard, that it frequently envelopes the harpooner in smoke; and if the wood were not repeatedly wetted, would probably set fire to the boat. During the capture of one whale, a groove is sometimes cut in the bollard near an inch in depth; and, were it not for a plate of brass, iron, or a block of lignum-vitæ, which covers the top of the stem where the line passes over, it is apprehended that the action of the line on the material of the boat, would cut it down to the water's-edge, in the course of one season of successful fishing. The approaching distress of a boat, for want of line, is indicated by the elevation of an oar, in the way of a mast, to which is added a

second, a third, or even a fourth, in proportion to the nature of the exigence. The utmost care and attention are requisite, on the part of every person in the boat, when the lines are running out; fatal consequences having been sometimes produced by the most trifling neglect. When the line happens "to run foul," and cannot be cleared on the instant, it sometimes draws the boat under water; on which, if no auxiliary boat, or convenient piece of ice, be at hand, the crew are plunged into the sea, and are obliged to trust to the buoyancy of their oars or to their skill in swimming, for supporting themselves on the surface. To provide against such an accident, as well as to be ready to furnish an additional supply of lines, it is usual, when boats are sent in pursuit, for two to go out in company; and when a whale has been struck, for the first assisting boat which approaches, to join the fast-boat, and to stay by it, until the fish reappears. The other boats likewise make towards the one carrying a flag, and surround it at various distances, awaiting the appearance of the wounded whale.

On my first voyage to the whale-fishery, such an accident as above alluded to, occurred. A thousand fathoms of line were already out, and the fast-boat was forcibly pressed against the side of a piece of ice. The harpooner, in his anxiety to retard the flight of the whale, applied too many turns of the line round the bollard, which, getting en-

tangled, drew the boat beneath the ice. Another boat, providentially was at hand, into which the crew, including myself, who happened to be present, had just time to escape. The whale, with near two miles' length of line, was, in consequence of the accident, lost, but the boat was recovered. On a subsequent occasion, I underwent a similar misadventure, but with a happier result; we escaped with a little wetting into an accompanying boat, and the whale was afterwards captured, and the boat with its lines recovered.

When fish have been struck by myself, I have on different occasions estimated their rate of descent. For the first 300 fathoms, the average velocity was usually after the rate of eight to ten miles *per* hour. In one instance, the third line of 120 fathoms was run out in 61 seconds; that is, at the rate of $8\frac{1}{6}$ English miles, or $7\frac{1}{8}$ nautical miles *per* hour.

By the motions of the fast-boat, the simultaneous movements of the whale are estimated. The auxiliary boats, accordingly, take their stations, about the situation where the whale, from these motions, may reasonably be expected to appear.

The average stay under water, of a wounded whale, which steadily descends after being struck, according to the most usual conduct of the animal, is about 30 minutes. The longest stay I ever observed was 56 minutes; but in shallow water, I have been in-

formed, it has sometimes been known to remain an hour and a half at the bottom after being struck, and yet has returned to the surface alive. The greater the velocity, the more considerable the distance to which it descends, and the longer the time it remains under water, so much greater in proportion is the extent of its exhaustion, and the consequent facility of accomplishing its capture. Immediately that it re-appears, the assisting boats make for the place with their utmost speed, and as they reach it, each harpooner plunges his harpoon into its back, to the amount of three, four, or more, according to the size of the whale, and the nature of the situation. Most frequently, however, it descends for a few minutes after receiving the second harpoon, and obliges the other boats to await its return to the surface, before any further attack can be made. It is afterwards actively plied with lances, which are thrust into its body, aiming at its vitals. At length, when exhausted by numerous wounds and the loss of blood, which flows from the huge animal in copious streams, it indicates the approach of its dissolution, by discharging from its "blow-holes," a mixture of blood along with the air and mucus which it usually expires, and finally jets of blood alone. The sea, to a great extent around, is dyed with its blood, and the ice, boats, and men, are sometimes drenched with the same. Its track is likewise marked by a broad pellicle of oil,

which exudes from its wounds, and appears on the surface of the sea. Its final capture is sometimes preceded by a convulsive and energetic struggle, in which its tail, reared, whirled, and violently jerked in the air, resounds to the distance of miles. In dying, it turns on its back or on its side; which joyful circumstance is announced by the capturers with the striking of their flags, accompanied with three lively huzzas!

The remarkable exhaustion observed on the first appearance of a wounded whale at the surface, after a descent of 700 or 800 fathoms perpendicular, does not depend on the nature of the wound it has received; for a hundred superficial wounds received from harpoons, could not have the effect of a single lance penetrating the vitals, but is the effect of the almost incredible pressure to which the animal must have been exposed. The surface of the body of a large whale, may be considered as comprising an area of 1540 square feet. This, under the common weight of the atmosphere only, must sustain a pressure of 3,104,640 lb., or 1386 tons. But at the depth of 800 fathoms, where there is a column of water equal in weight to about 154 atmospheres, the pressure on the animal must be equal to 211,200 tons*.

* From experiments made with sea water taken up near Spitzbergen, I find that 35 cubical feet weigh a ton. Now, supposing a whale to descend to the depth of 800 fathoms, or 4800 feet,

This is a degree of pressure of which we can have but an imperfect conception. It may assist our comprehension, however, to be informed, that it exceeds in weight sixty of the largest ships of the British navy, when manned, provisioned, and fitted for a six months cruise.

Every boat *fast* to a living whale carries a flag, and the ship to which such boats belong, also wears a flag, until the whale is either killed or makes its escape. These signals serve to indicate to surrounding ships, the exclusive title of the "fast-ship" to the entangled whale, and to prevent their interference, excepting in the way of assistance, in the capture.

A very natural inquiry connected with this subject, is, What is the length of time requisite for capturing a whale? This is a question which can only be answered indirectly; for I have myself witnessed the capture of a large whale, which has been effected in twenty-eight minutes; and have also been engaged with another fish which was lost, after it had been entangled about sixteen hours. Instances are well authenticated, in which whales have

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which, I believe, is not uncommon, we have only to divide 4800 feet, the length of the column of water pressing upon the whale, by 35 feet, the length of a column of sea-water, a foot square, weighing a ton, the quotient 137½, shows the pressure *per* square foot upon the whale, in tons; which, multiplied by 1540, the number of square feet of surface exposed by the animal, affords a product of 211,200 tons, besides the usual pressure of the atmosphere.

yielded their lives to the lances of active fishers, within the space of fifteen minutes from the time of being struck; and in cases where fish have been shot with a harpoon-gun, in a still shorter period; while other instances are equally familiar and certain, wherein a whale having gained the shelter of a pack or compact patch of ice, has sustained or avoided every attack upon it, during the space of forty or fifty hours. Some whales have been captured when very slightly entangled with a single harpoon, while others have disengaged themselves, though severely wounded with lances, by a single act of violent and convulsive distortion of the body, or tremendous shake of the tail, from four or more harpoons; in which act, some of the lines have been broken with apparent ease, and the harpoons to which other lines were attached, either broken or torn out of the body of the vigorous animal. Generally, the speedy capture of a whale depends on the activity of the harpooners, the favourableness of situation and weather, and, in no inconsiderable degree, on the peculiar conduct of the whale attacked. Under the most favourable circumstances; namely, when the fishermen are very active, the ice very open, or the sea free from ice, and the weather fine,—the average length of time occupied in the capture of a whale, may be stated as not exceeding an hour*. The

* Twelve large whales taken in different voyages, memoranda of whose capture I have preserved, were killed, on an

general average, including all sizes of fish and all circumstances of capture, may probably be two or three hours.

The method practised in the capture of whales, under favourable circumstances, is very uniform with all the fishers, both Britains and foreigners. The only variation observable in the proceedings of the different fishers, consisting in the degree of activity and resolution displayed, in pursuance of the operations of harpooning and lancing the whale, and in the address manifested in improving by any accidental movement of the fish, which may lay it open to an effectual attack,—rather than in any thing different or superior in the general method of conducting the fishery. It is true, that with some the harpoon-gun is much valued, and used with advantage, while with others, it is held in prejudiced aversion; yet, as this difference of opinion affects only the first attack and entanglement of the whale, the subsequent proceedings with all the fishers, may still be said to be founded on equal and unanimous principles. Hence, the mode described in the preceding pages, of conducting the fishery for whales under favourable circumstances, may be considered

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average, in 67 minutes. The shortest time expended in the taking of one of the 12 whales, was 28 minutes; the longest time 2 hours. One of these whales, we believed, descended 670 fathoms perpendicular; another 720; and a third 750. One descended 1400 fathoms obliquely, and another 1600 fathoms.

as the general plan pursued by the fishers of all the ports of Britain, as well as those of other nations who resort to Spitzbergen. Neither is there any difference in the plan of attack, or mode of capture between fish of large size, and those of lesser growth: the proceedings are the same, but, of course, with the smaller whales less force is requisite; though it sometimes happens, that the trouble attached to the killing of a very small whale, exceeds that connected with the capture of one of the largest individuals. The progress or flight of a large whale cannot be restrained; but that of an under-size fish may generally be confined within the limits of 400 to 600 fathoms of line. A full grown fish generally occupies the whole, or nearly the whole, of the boats belonging to one ship in its capture; but three, four, and sometimes more small fish, have been killed at the same time, by six or seven boats. It is not unusual for small whales to run downward, until they exhaust themselves so completely, that they are not able to return to the surface, but are suffocated in the water. As it is requisite that a whale that has been *drowned* should be drawn up by the line, which is a tedious and troublesome operation, it is usual to guard against such an event, by resisting its descent with a tight strain on the line, and also by hauling upon the line the moment its descent is stopped, with a view of irritating the wound, and occasioning such a degree of pain, as may induce it to return to the

surface, where it can be killed and secured without farther trouble. Seldom more than two harpoons are struck into an under-size whale.

The ease with which some whales are subdued, and the slightness of the entanglement by which they are taken, is truly surprising; but with others it is equally astonishing, that neither line nor harpoon, nor any number of each, is sufficiently strong to effect their capture. Many instances have occurred where whales have escaped from four, five, or even more harpoons, while fish equally large have been killed through the medium of a single harpoon. Indeed, whales have been taken in consequence of the entanglement of a line, without any harpoon at all; though, when such a case has occurred, it has evidently been the result of accident. The following instances are in point.

A whale was struck from one of the boats of the ship Nautilis, in Davis' Straits. It was killed, and, as is usual after the capture, it was disentangled of the line connected with the "first fast-boat," by dividing it at the splice of the foreganger, within 8 or 9 yards of the harpoon. The crew of the boat from which the fish was first struck, in the mean time were employed in heaving in the lines, by means of a winch, fixed in the boat for the purpose, which they progressively effected for some time. On a sudden, however, to their great astonishment, the lines were pulled away from them,

with the same force and violence as by a whale when first struck. They repeated their signal, indicative of a whale being struck, their shipmates flocked towards them, and while every one expressed a similar degree of astonishment with themselves, they all agreed that a fish was fast to the line. In a few minutes, they were agreeably confirmed in their opinion, and relieved from suspense, by the rising of a large whale close by them, exhausted with fatigue, and having every appearance of a fast-fish. It permitted itself to be struck by several harpoons at once, and was speedily killed. On examining it after death, for discovering the cause of such an interesting accident, they found the line belonging to the above mentioned boat in its mouth, where it was still firmly fixed by the compression of its lips. The occasion of this happy and puzzling accident, was therefore solved;—the end of the line, after being cut from the whale first killed, was in the act of sinking in the water,—the fish in question, engaged in feeding, was advancing with its mouth wide open, and accidentally caught the line between its extended jaws,—a sensation so utterly unusual as that produced by the line, had induced it to shut its mouth and grasp the line which was the cause of its alarm, so firmly between its lips, as to produce the effect just stated. This circumstance took place many years ago, but a similar one occurred in the year 1814.

A harpooner belonging to the Prince of Brazils, of Hull, had struck a small fish. It descended, and remained for some time quiet, and at length appeared to be drowned. The strain on the line being then considerable, it was taken to the ship's capstern, with a view of heaving the fish up. The force requisite for performing this operation, was extremely various; sometimes the line came in with ease, at others a quantity was withdrawn with great force and rapidity. As such, it appeared evident, that the fish was yet alive. The heaving, however, was persisted in, and after the greater part of the lines had been drawn on board, a dead fish appeared at the surface, secured by several turns of the line round its body. It was disentangled with difficulty, and was confidently believed to be the whale that had been struck. But when the line was cleared from the fish, it proved to be merely the "bight," for the end still hung perpendicularly downward. What was then their surprise to find, that it was still pulled away with considerable force? The capstern was again resorted to, and shortly afterwards they hove up, also dead, the fish originally struck, with the harpoon still fast! Hence it appeared, that the fish first drawn up had got accidentally entangled with the line, and in its struggles to escape, had still further involved itself, by winding the line repeatedly round its body. The first fish entangled, as was suspected, had long been

dead; and it was this lucky interloper that occasioned the jerks and other singular effects observed on the line.

SECT. VIII.

Alterations produced in the Manner of conducting the Fishery, by peculiar Circumstances of Situation and Weather.

HITHERTO I have only attempted to describe the method adopted for the capture of whales, under favourable circumstances,—such as occur in open water or amongst open ice in fine weather; as, however, this method is subject to various alterations, when the situation or circumstances are peculiar, I shall venture a few remarks on the subject.

1. *Pack-fishing.*—The borders of close packs of drift ice are frequently a favourite resort of large whales. To attack them in such a situation, subjects the fisher to great risk in his lines and boats, as well as uncertainty in effecting their capture. When a considerable swell prevails on the borders of the ice, the whales, on being struck, will sometimes recede from the pack, and become the prize of their assailers; but most generally they flee to it for shelter, and frequently make their escape. To guard against the loss of lines as much as possible,

it is pretty usual either to strike two harpoons from different boats at the same moment, or to *bridle* the lines of a second boat upon those of the boat from which the fish is struck. This operation consists in fixing other lines to those of the fast-boat, at some distance from the harpoon, so that there is only one harpoon and one line immediately attached to the fish, but the double strength of a line from the place of their junction to the boats. Hence, should the fish flee directly into the ice, and proceed to an inaccessible distance, the two boats bearing an equal strain on each of their lines, can at pleasure draw the harpoon, or break the single part of the line immediately connected with it, and in either case, secure themselves against any considerable loss.

When a pack, from its compactness, prevents boats from penetrating, the men travel over the ice, leaping from piece to piece, in pursuit of the entangled whale. In this pursuit, they carry lances with them, and sometimes harpoons, with which, whenever they can approach the fish, they attack it,—and if they succeed in killing it, they drag it towards the exterior margin of the ice, by means of the line fastened to the harpoon with which it was originally struck. In such cases, it is generally an object of importance to sink it beneath the ice; for effecting which purpose, each lobe of the tail is divided from the body, excepting a small portion of the edge, from which it hangs

pendulous in the water. If it still floats, bags of sand, kedges, or small cannon, are suspended by a block on the bight of the line, wherewith the buoyancy of the dead whale is usually overcome. It then sinks, and is easily hauled out by the line into the open sea.

To particularise all the variety in pack-fishing, arising from winds and weather, size of the fish, state and peculiarities of the ice, &c. would require more space than the interest of the subject, to general readers, would justify. I shall, therefore, only remark, that pack-fishing is, on the whole, the most troublesome and dangerous of all others;—that instances have occurred of fish having been entangled during 40 or 50 hours, and have escaped after all;—and that other instances are remembered, of ships having lost the greater part of their stock of lines, several of their boats, and sometimes, though happily less commonly, some individuals of their crews.

2. *Field-fishing.*—The fishery for whales, when conducted at the margin of these wonderful sheets of solid ice, called fields, is, when the weather is fine, and the refuge for ships secure, of all other situations which the fishery of Greenland presents, the most agreeable, and sometimes the most productive. A fish struck at the margin of a large field of ice, generally descends obliquely beneath it, takes four to eight lines from the fast-boat, and then returns

exhausted to the edge. It is then attacked in the usual way with harpoons and lances, and is easily killed. There is one evident advantage in field-fishing, which is this: When the fast-boat lies at the edge of a firm unbroken field, and the line proceeds in an angle beneath the ice, the fish must necessarily arise somewhere in a semicircle described from the fast-boat as a centre, with a sweep not exceeding the length of the lines out; but most generally it appears in a line extending along the margin of the ice, so that the boats, when dispersed along the edge of the field, are as effectual and as ready for promoting the capture as twice the number of boats or more, when fishing in open situations; because, in open situations, the whale may arise any where within a circle, instead of a semicircle, described by the length of the lines withdrawn from the fast-boat,—whence it frequently happens, that all the attendant boats are disposed in a wrong direction, and the fish recovers its breath, breaks loose, and escapes before any of them can secure it with a second harpoon. Hence when a ship fishes at a field with an ordinary crew and six or seven boats, two of the largest fish may be struck at the same time with every prospect of success; while the same force attempting the capture of two at once in an open situation, will not unfrequently occasion the loss of both. There have indeed been instances of a ship's crew, with seven boats,

striking, at a field, six fish at the same time, and of succeeding in killing the whole. Generally speaking, six boats at a field are capable of performing the same execution as near twice that number in open situations. Besides, fields sometimes afford an opportunity of fishing, when in any other situation there can be little or no chance of success, or, indeed, when to fish elsewhere is utterly impracticable. Thus calms, storms and fogs, are great annoyances in the fishery in general, and frequently prevent it altogether; but at fields the fishery goes on under any of these disadvantages. As there are several important advantages attending the fishery at fields, so likewise there are some serious disadvantages,—chiefly relating to the safety of the ships engaged in the occupation. The motions of fields are rapid, various, and unaccountable, and the power with which they approach each other, and squeeze every resisting object, immense,—hence occasionally vast mischief is produced, which it is not always in the power of the most skilful and attentive master, to foresee or prevent.

Such are the principal advantages and disadvantages of fields of ice to the whale-fishers. The advantages, however, as above enumerated, though they extend to large floes, do not extend to small floes, or to such fields, how large soever they may be, as contain cracks or holes, or are filled up with thin ice in the interior. Large and firm fields are the most

convenient, and likewise the most advantageous for the fishery; the most convenient, because the whales, unable to breathe beneath a close extensive field of ice, are obliged to make their appearance again above water among the boats on the look-out; and they are the most advantageous, because, not only the most fish commonly resort to them, but a greater number can be killed with less force, and in a shorter space of time, than in any other situation. Thin fields, or fields full of holes, being by no means advantageous to fish by, are usually avoided, because a "fast-fish" retreating under such a field, can respire through the holes in the centre as conveniently as on the exterior; and a large fish usually proceeds from one hole to another, and, if determined to advance, cannot possibly be stopped. In this case, all that can be done is, to break the line or draw the harpoon out. But when the fish can be observed "blowing" in any of the holes in a field, the men travel over the ice and attack it with lances, pricking it over the nose, to endeavour to turn it back. This scheme, however, does not always answer the expectations of the fishers, as frequently the fear of his enemies acts so powerfully on the whale, that he pushes forward towards the interior to his dying moment. When killed, the same means are used as in pack-fishing, to sink it, but they do not always succeed; for the harpoon is frequently drawn out, or the line broken in the attempt. If, therefore, no

attempt to sink the fish avails, there is scarcely any other practicable method of making prize of it, (unless when the ice happens to be so thin that it can be broken with a boat, or a channel readily cut in it with an ice-saw), than cutting the blubber away, and dragging it piece by piece across the ice to the vessel, which requires immense labour, and is attended with vast loss of time. Hence we have a sufficient reason for avoiding such situations, whenever fish can be found elsewhere. As connected with this subject, I cannot pass over a circumstance which occurred within my own observation, and which excited my highest admiration.

On the 8th of July 1813, the ship Esk lay by the edge of a large sheet of ice, in which were several thin parts and some holes. Here a fish being heard *blowing*, a harpoon, with a line connected to it, was conveyed across the ice, from a boat on guard, and the harpooner succeeded in striking the whale, at the distance of 350 yards from the verge. It dragged out ten lines, (2400 yards) and was supposed to be seen blowing in different holes in the ice. After some time, it happened to make its appearance on the exterior, when a harpoon was struck at the moment it was on the point of proceeding again beneath. About a hundred yards from the edge, it broke the ice where it was a foot in thickness, with its *crown*, and respired through the opening. It then determinately pushed forward,

breaking the ice as it advanced, in spite of the lances constantly directed against it. It reached at length a kind of bason in the field, where it floated on the surface of the water, without any encumbrance from ice. Its back being fairly exposed, the harpoon struck from the boat on the outside, was observed to be so slightly entangled, that it was ready to drop out. Some of the officers lamented this circumstance, and expressed a wish that the harpoon were better *fast*,—observing, at the same time, that if it should slip out, the fish would either be lost, or they would be under the necessity of flensing it where it lay, and of dragging the pieces of blubber over the ice to the ship; a kind and degree of labour every one was anxious to avoid. No sooner was the wish expressed, and its importance made known, than one of the sailors, a smart and enterprising fellow, stept forward and volunteered his services to strike it better in. Not at all intimidated by the surprise which was manifested in every countenance, by such a bold proposal,—he pulled out his pocket-knife,—leapt upon the back of the living whale,—and immediately cut the harpoon out. Stimulated by this courageous example, one of his companions proceeded to his assistance. While one of them hauled upon the line and held it in his hands, the other set his shoulder against the extremity of the harpoon, and though it was without a stock, he contrived to strike it again into the fish,

more effectually than it was at first! The fish was in motion before they finished. After they got off its back, it advanced a considerable distance, breaking the ice all the way, and survived this uncommon treatment, ten or fifteen minutes. This admirable act was an essential benefit. The fish fortunately sunk spontaneously, after being killed; on which it was hauled out to the edge of the ice by the line, and secured without further trouble. It proved a stout whale, and a very acceptable prize.

When a ship approaches a considerable field of ice and finds whales, it is usual to moor to the leeward side of it, from which the adjoining ice usually first separates. Boats are then placed on watch, on each side of the ship, and stationed at intervals of 100 or 150 yards from one another, along the edge of the ice. Hence, if a fish arises any where between the extreme boats, it seldom escapes unhurt. It is not uncommon for a great number of ships to moor to the same sheet of ice. When the whale-fishery of the Hollanders was in a flourishing state, above 100 sail of ships might sometimes be seen moored to the same field of ice, each having two or more boats on watch. The field would, in consequence, be so nearly surrounded with boats, that it was almost impossible for a fish to rise near the verge of the ice, without being within the limits of a start of some of them.

3. *Fishing in Crowded Ice, or in Open Packs.*—In navigably open drift ice, or among small detached streams and patches, either of which serve in a degree to break the force of the sea, and to prevent any considerable swell from arising, we have a situation which is considered as one of the best possible for conducting the fishery in; consequently, it comes under the same denomination as those favourable situations, in which I have first attempted to describe the proceedings of the fishers in killing the whale. But the situation I now mean to refer to is, when the ice is crowded and nearly close; so close, indeed, that it scarcely affords room for boats to pass through it, and by no means sufficient space for a ship to be navigated among it. This kind of situation occurs in somewhat open packs, or in large patches of crowded ice, and affords a fair probability of capturing a whale, though it is seldom accomplished without a considerable deal of trouble. When the ice is very crowded, and the ship cannot sail into it with propriety, it is usual, especially with foreigners, to seek out for a mooring to some large mass of ice, if such can be found, extending two or three fathoms, or more, under water. A piece of ice of this kind, is capable not only of holding the ship "head-to-wind," but also to windward of the smaller ice. The boats then set out in chase of any fish which may be seen; and when one happens to be struck, they proceed in the capture in a similar man-

ner as when under more favourable circumstances; excepting so far as the obstruction which the quality and arrangement of the ice may offer, to the regular system of proceeding. Among crowded ice, for instance, the precise direction pursued by the fish is not easily ascertained, nor can the fish itself be readily discovered on its first arrival at the surface, after being struck, on account of the elevation of the intervening masses of ice, and the great quantity of line it frequently takes from the fast-boat. Success in such a situation, depends on the boats being spread widely abroad, and on a judicious arrangement of each boat; on a keen look-out on the part of the harpooners in the boats, and on their occasionally taking the benefit of a hummock of ice, from the elevation of which the fish may sometimes be seen "blowing" in the interstices of the ice; on pushing or rowing the boats with the greatest imaginable celerity, towards the place where the fish may have been seen; and, lastly, on the exercise of the highest degree of activity and dispatch, in every proceeding.

If these means be neglected, the fish will generally have taken its breath, recovered its strength, and removed to some other quarter, before the arrival of the boats; and it is often remarked, that if there be one part of the ice more crowded or more difficult of access than another, it commonly retreats thither for refuge. In such cases, the sailors find much difficulty in getting to it with their boats, having

to separate many pieces of ice before they can pass through between them. But when it is not practicable to move the pieces, and when they cannot travel over them, they must either drag the boats across the intermediate ice, or perform an extensive circuit, before they can reach the opposite side of the close ice, into which the whale has retreated.

A second harpoon in this case, as indeed in all others, is a material point. They proceed to lance whenever the second harpoon is struck, and strike more harpoons as the auxiliary boats progressively arrive at the place.

When the fish is killed, it is often at a distance from the ship, and so circumstanced, that the ship cannot get near it. In such cases, the fish must be *towed* by the boats to the ship; an operation which, among crowded ice, is most troublesome and laborious.

4. *Bay Ice Fishing.*—Bay ice constitutes a situation which, though not particularly dangerous, is yet, on the whole, one of the most troublesome in which whales are killed. In sheets of bay ice, the whales find a very effectual shelter; for so long as the ice will not "carry a man," they cannot be approached with a boat, without producing such a noise, as most certainly warns them of the intended assault. And if a whale, by some favourable accident, were struck, the difficulties of completing the capture are always numerous, and sometimes prove insurmountable. The whale having free loco-motion beneath the ice,

the fishers pursue it under great disadvantage. The fishers cannot push their boats towards it but with extreme difficulty; while the whale, invariably warned by the noise of their approach, possesses every facility for avoiding its enemies.

In the year 1813, I adopted a new plan of fishing in bay ice, which was attended with the most fortunate result. The ship under my command, (the Esk of Whitby,) was frozen into a sheet of bay ice, included in a triangular space, formed by several massive fields and floes. Here a number of small whales were seen sporting around us, in every little hole or space in the bay ice, and occasionally they were observed to break through it, for the purpose of breathing. In various little openings, free of ice, near the ship, few of which were twenty yards in diameter, we placed boats; each equipped with a harpoon and lines, and directed by two or three men. They had orders to place themselves in such a situation, that if a fish appeared in the same opening, they could scarcely fail of striking it. Previous to this, I provided myself with a pair of *ice-shoes*, consisting of two pieces of thin deal, six feet in length, and seven inches in breadth. They were made very thin at both ends; and, in the centre of each, was a hollow place exactly adapted for the reception of the sole of my boot, with a loop of leather for confining the toes. I was thus enabled to retain the ice-shoes pretty firmly to my feet,

when required, or, when I wished it, of disengaging them in a moment. Where the ice was smooth, it was easy to move in a straight line; but, in turning, I found a considerable difficulty, and required some practice before I could effect it, without falling. I advanced with tolerable speed, where the ice was level on the surface, by sliding the shoes alternately forward; but when I met with rough hilly places, I experienced great inconvenience. When, however, the rough places happened to consist of strong ice, which generally was the case, I stepped out of my ice-shoes, until I reached a weaker part. Equipped with this apparatus, I travelled safely over ice which had not been frozen above twenty-four hours, and which was incapable of supporting the weight of the smallest boy in the ship.

Whenever a fish was struck, I gave orders to the harpooner, in running the lines, to use every means of drowning it; the trouble of hauling it up, under the circumstances in which the ship was placed, being a matter of no consideration. This was attempted, by holding a steady tight strain on the line, without slacking it, or jerking it unnecessarily, and by forbearing to haul at the line when the fish stopped. By this measure, one fish, the stoutest of three which we got, was drowned. When others were struck, and the attempt to drown them failed, I provided myself with a harpoon; and, observing the direction of the line, travelled towards the place

where I expected the fish to rise. A small boat was launched, more leisurely, in the same direction, for my support; and wherever the ice, in my track, was capable of supporting a man, assistance was afforded me in dragging the line. When the wounded fish appeared, I struck my harpoon through the ice, and then, with some occasional assistance, proceeded to lance it, until it was killed. At different times the fish rose beneath my feet, and broke the ice on which I stood: on one occasion, where the ice was fortunately more than usually strong, I was obliged to leave my ice-shoes and skip off. In this way we captured three fish, and took their produce on board, while several ships near us made not the least progress in the fishery. After they were killed, we had much trouble in getting them to the ship, but as we could not employ ourselves to advantage in any other way, we were well satisfied with the issue. This part of the business, however, I could not effect alone, and all hands who were occasionally employed in it, broke through the ice. Some individuals broke in two or three times, but no serious accident ensued. As a precaution, we extended a rope from man to man, which was held in the hands of each in their progress across the ice, and which served for drawing those out of the water who happened to break through. Sometimes ten or a dozen of them would break in at once; but so far was such an occurrence from exciting distress,

that each of their companions indulged a laugh at their expence, notwithstanding they, probably, shared the same fate a minute or two afterwards. The shivering tars were, in general, amply repaid for the drenching they had suffered, by a dram of spirits, which they regularly received on such occasions. I have seen instances, indeed, of sailors having voluntarily broken through the ice, for the mere purpose of receiving the usual *precious* beverage.

5. *Fishing in Storms.*—Excepting in situations sheltered from the sea by ice, it would be alike useless and presumptuous, to attempt to kill whales during a storm. Cases, however, occur, wherein fish that were struck during fine weather, or in winds which do not prevent the boats from plying about, remain entangled, but unsubdued, after the commencement of a storm. Sometimes the capture is completed, at others the fishers are under the necessity of cutting the lines, and allowing the whale to escape. Sometimes when they have succeeded in killing it, and in securing it during the gale with a hawser to the ship, they are enabled to make a prize of it on the return of moderate weather; at others, after having it to appearance secured, by means of a sufficient rope, the dangerous proximity of a lee pack constrains them to cut it adrift and abandon it, for the preservation of their vessel. After thus being abandoned, it becomes the prize of the first who gets possession of it, though it be in

in the face of the original capturers. A storm commencing while the boats are engaged with an entangled fish, sometimes occasions serious disasters. Generally, however, though they suffer the loss of the fish, and perhaps some of their boats and materials, yet the men escape with their lives.

6. *Fishing in Foggy Weather.*—The fishery in storms, in exposed situations, can never be voluntary, as the case only happens when a storm arises, subsequent to the time of a fish being struck; but in foggy weather, though occasionally attended with hazard, the fishery is not altogether impracticable. The fogs which occur in the icy regions in June and July, are generally dense and lasting. They are so thick, that objects cannot be distinguished at the distance of 100 or 150 yards, and frequently continue for several days without attenuation. To fish with safety and success, during a thick fog, is, therefore, a matter of difficulty, and of still greater uncertainty. When it happens that a fish conducts itself favourably, that is, descends almost perpendicularly, and on its return to the surface remains nearly stationary, or moves round in a small circle, the capture is usually accomplished without hazard or particular difficulty: but when, on the contrary, it proceeds with any considerable velocity in a horizontal direction, or obliquely downwards, it soon drags the boats out of sight of the ship, and shortly so confounds the fishers in the intensity

of the mist, that they lose all traces of the situation of their vessel. If the fish, in its flight, draws them beyond the reach of the sound of a bell, or a horn, their personal safety becomes endangered; and if they are removed beyond the sound of a cannon, their situation becomes extremely hazardous; especially if no other ships happen to be in the immediate vicinity. Meanwhile, whatever may be their imaginary or real danger, the mind of their commander must be kept in the most anxious suspense until they are found; and whether they may be in safety, or near perishing with fatigue, hunger and cold, so long as he is uncertain of their fate, his anxiety must be the same. Hence it is, that feelings excited by uncertainty are frequently more violent and distressing than those produced by the actual knowledge of the truth.

Keen and vigilant observance of the direction pursued by the whale, on the part of the persons engaged in the chase, and a corresponding observance of the same by their commander, can be the only means within the power of each party of securing the ship and boats from being widely separated, without knowing what course to pursue for reuniting them. Much depends on the people employed in the boats using every known means to arrest the progress of the fish in its flight, by attacking it with the most skilful, active and persevering

efforts, until it is killed; and then, as speedily as may be, of availing themselves of the intimation they may possess relative to the position of the ship, for the purpose of rejoining her. But as their knowledge of the direction of their movements generally depends on the wind, unless they happen to be provided with a compass, and have attentively marked their route by its indications, any change in the direction of the wind, must be attended with serious consequences.

To describe this subject fully, and to enter into the detail of the various modes which ingenuity may adopt for maintaining the proximity of a ship with her boats, and the safety of the latter when engaged in the fishery during the obscurity of a fog, would be tedious, and in a work of this nature superfluous; I shall therefore proceed with another branch of my subject. But before I enter upon the subsequent operations of the whalers connected with a successful fishery, I shall give a few examples of remarkable strength, activity, or other peculiarity in the behaviour of whales after they have been struck; being a few of the curious circumstances connected with the fishery which I have myself observed, or have received from unquestionable authority.

SECT. IX.

Anecdotes illustrative of Peculiarities in the Whale-Fishery.

1. *Surprising vigour of a Whale.* — On the 25th of June 1812, one of the harpooners belonging to the Resolution of Whitby, under my command, struck a whale by the edge of a small floe of ice. Assistance being promptly afforded, a second boat's lines were attached to those of the *fast-boat*, in a few minutes after the harpoon was discharged. The remainder of the boats proceeded to some distance, in the direction the fish seemed to have taken. In about a quarter of an hour the fast-boat, to my surprise, again made a signal for lines. As the ship was then within five minutes sail, we instantly steered towards the boat, with the view of affording assistance, by means of a spare boat we still retained on board. Before we reached the place, however, we observed four oars displayed in signal order, which, by their number, indicated a most urgent necessity for assistance. Two or three men were at the same time seen seated close by the stern, which was considerably elevated, for the purpose of keeping it down,—while the bow of the boat, by the force of the line, was drawn down to the level of the sea,—and the harpooner, by the friction of the

line round the bollard, was enveloped in smoky obscurity. At length, when the ship was scarcely 100 yards distant, we perceived preparations for quitting the boat. The sailors' *pea*-jackets were cast upon the adjoining ice,—the oars were thrown down,—the crew leaped overboard,—the bow of the boat was buried in the water,—the stern rose perpendicular, and then majestically disappeared. The harpooner having caused the end of the line to be fastened to the iron-ring at the boat's stern, was the means of its loss *; and a *tongue* of the ice, on which was a depth of several feet of water, kept the boat, by the pressure of the line against it, at such a considerable distance as prevented the crew from leaping upon the floe. Some of them were, therefore, put to the necessity of swimming for their preservation, but all of them succeeded in scrambling upon the ice, and were taken on board of the ship in a few minutes afterwards.

I may here observe, that it is an uncommon circumstance for a fish to require more than two boats' lines in such a situation;—none of our harpooners, therefore, had any scruple in leaving the fast-boat, never suspecting, after it had received the

* "Giving a whale the boat," as the voluntary sacrifice of a boat is termed, is a scheme not unfrequently practised by the fisher when in want of line. By submitting to this risk, he expects to gain the fish, and still has the chance of recovering his boat and its materials. It is only practised in open ice or at fields.

assistance of one boat with six lines or upward, that it would need any more.

Several ships being about us, there was a possibility that some person might attack and make a prize of the whale, when it had so far escaped us, that we no longer retained any hold of it; as such, we set all the sail the ship could safely sustain, and worked through several narrow and intricate channels in the ice, in the direction I observed the fish had retreated. After a little time, it was descried by the people in the boats, at a considerable distance to the eastward; a general chase immediately commenced, and within the space of an hour three harpoons were struck. We now imagined the fish was secure, but our expectations were premature. The whale resolutely pushed beneath a large floe that had been recently broken to pieces, by the swell, and soon drew all the lines out of the second fast-boat; the officer of which, not being able to get any assistance, tied the end of his line to a hummock of ice and broke it. Soon afterwards, the other two boats, still *fast*, were dragged against the broken floe, when one of the harpoons drew out. The lines of only one boat, therefore, remained fast to the fish, and this with six or eight lines out, was dragged forward into the shattered floe with astonishing force. Pieces of ice, each of which were sufficiently large to have answered the purpose of a mooring for a ship, were wheeled about by the strength of the whale; and such was the ten-

sion and elasticity of the line, that whenever it slipped clear of any mass of ice, after turning it round, into the space between any two adjoining pieces, the boat and its crew flew forward through the crack, with the velocity of an arrow, and never failed to launch several feet upon the first mass of ice that it encountered.

While we scoured the sea around the broken floe with the ship, and while the ice was attempted in vain by the boats, the whale continued to press forward in an easterly direction towards the sea. At length, when 14 lines (about 1680 fathoms) were drawn from the fourth fast-boat, a slight entanglement of the line, broke it at the stem. The fish then again made its escape, taking along with it a boat and 28 lines. The united length of the lines was 6720 yards, or upwards of $3\frac{3}{4}$ English miles; value, with the boat, above 150 *l.* Sterling.

The obstruction of the sunken boat, to the progress of the fish, must have been immense; and that of the lines likewise considerable; the weight of the lines alone, being 35 hundred weight.

So long as the fourth fast-boat, through the medium of its lines, retained its hold of the fish, we searched the adjoining sea with the ship in vain; but, in a short time after the line was divided, we got sight of the object of pursuit, at the distance of near two miles to the eastward of the ice and boats, in the open sea. One boat only with lines, and two

empty boats, were reserved by the ship. Having, however, fortunately fine weather, and a fresh breeze of wind, we immediately gave chase under all sails; though, it must be confessed, with the insignificant force by us, the distance of the fish, and the rapidity of its flight considered, we had but very small hopes of success. At length, after pursuing it five or six miles, being at least nine miles from the place where it was struck, we came up with it, and it seemed inclined to rest after its extraordinary exertions. The two dismantled or empty boats having been furnished with two lines each, (a very inadequate supply,) they, together with the one in a good state of equipment, now made an attack upon the whale. One of the harpooners made a blunder; the fish saw the boat, took the alarm and again fled. I now supposed it would be seen no more; nevertheless, we chased nearly a mile in the direction I imagined it had taken, and placed the boats, to the best of my judgment, in the most advantageous situations. In this case we were extremely fortunate. The fish rose near one of the boats, and was immediately harpooned. In a few minutes two more harpoons entered its back, and lances were plied against it with vigour and success. Exhausted by its amazing exertions to escape, it yielded itself at length to its fate, received the piercing wounds of the lances without resistance, and finally died without a struggle. Thus terminated with success, an attack

upon a whale, which exhibited the most uncommon determination to escape from its pursuers, seconded by the most amazing strength of any individual whose capture I ever witnessed. After all, it may seem surprising, that it was not a particularly large individual; the largest lamina of whalebone only measuring 9 feet 6 inches, while those affording 12 feet *bone* are not uncommon *. The quantity of line withdrawn from the different boats engaged in the capture, was singularly great. It amounted, altogether, to 10,440 yards †, or nearly six English

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* It has been frequently observed, that whales of this size are the most active of the species; and that those of very large growth are, in general, captured with less trouble.

† The following is a correct statement of the quantity of lines withdrawn from each of the fast-boats, viz.

		Yards.
From the first fast-boat	13 new lines, (the whole of which, together with the boat, were lost); harpoon drew,	3120
From the second fast-boat	6½ lines; line broke,	1560
third	3½ lines; harpoon drew,	840
fourth	14 lines; line broke,	3360
fifth	½ line; harpoon drew,	120
sixth	2½ lines,	600
seventh	2½ lines,	600
eighth	1 line,	240
	Total in yards,	10,440

miles. Of these, 13 new lines were lost, together with the sunken boat; the harpoon connecting them to the fish having dropt out before the whale was killed.

2. *Singular and unsuccessful Chase of a Whale.* —After having taken a large circuit with the ship Esk in the open sea, in search of whales, we saw two or three individuals, when at the distance of about 20 miles from the Middle-Hook of the Foreland *. It was on the 15th of June 1814 we were thus situated. The weather was fine, and no ice in sight. A boat was dispatched towards one of the fish we saw, which was immediately struck. The men were already considerably fatigued, having been employed immediately before, in the arduous operation, hereafter to be described, called *making off*; but, of course, proceeded in the boats to the chase of the fast-fish. It made its re-appearance before they all left the ship. Three boats then approached it, unluckily at the same moment. Each of them so incommoded the others, that no second harpoon could be struck. The fish then took the alarm, and run off towards the east, at the rate of about

* Charles's Island, lying parallel to the west side of Spitzbergen, is usually denominated the Foreland; the Middle Hook is a remarkable high ridge of mountains, near the middle of the island.

four miles *per* hour; some of the boats gave chase, and others took hold of the fast-boat, and were towed by it to windward. When two boats, by great exertions on the part of their crews, had got very near to the fish, and the harpooners were expecting every moment to be able to strike it, it suddenly shifted its course when under water, and in a few minutes discovered itself in a southerly direction, at least half a mile from any boat. It then completed a circuit round the fast-boat, with the sweep of nearly a mile as a radius, and though followed in its track by the boats, it dived before any of them got near it, and evaded them completely. When it appeared again, it was at least half a mile to windward of any of them, and then continued arduously advancing in the same direction. The "lipper" on the water, arising from a strong breeze of wind, much impeded the velocity of the boats, and rapidly exhausted the little remaining strength of their crews.

At various times during the pursuit, the boats having the most indefatigable crews, reached the fish within 10 or 15 yards, when, apparently aware of their design, it immediately sunk and changed its course; so that it invariably made its next appearance, in a quarter where no boats were near.

The most general course of the whale being to windward, it soon withdrew all the boats many

miles from the ship, notwithstanding our utmost efforts, under a pressure of sail, to keep near them. I was, therefore, prevented from directing their movements, or, indeed, from affording them the least assistance.

After six or seven hours pursuit, without success, the sky became overcast, and we were suddenly enveloped for some time, in the obscurity of a thick fog. This circumstance excited much alarm for the safety of the boats. We were soon, however, relieved, by the fog being dispelled. In this interval, the boats were all moored to the fast-boat, the men being fearful of being dispersed; but on the disappearance of the fog, the pursuit was recommenced with renewed and more determined vigour. Still the harpooners were not able to succeed. They were now convinced of the necessity of using every measure to retard the flight of the fish. For this purpose they slacked out nine lines, a weight in air of $11\frac{1}{4}$ *cwt.* while the crew of the fast-boat endeavoured farther to retard its progress, by holding their oars firmly in the water, as if in the act of backing the boat a-stern. But this plan did not succeed. They then lashed two or three boats with their sides to the stern of the fast-boat, and these were dragged broadside first, with little diminution of velocity for some time. But the fish at length feeling the impediment, suddenly changed its course,

and again disappointed the people in two of the boats, which had got extremely near it.

Several times the harpooners seized their weapons, and were on the point of launching them at the fish, when, in an instant, it shot from them with singular velocity, and then disappeared. In this way the chase was continued for fourteen hours, when the fish again turned to leeward. But the men exhausted by such uncommon exertion, together with the hard labour to which they had previously been subjected; at the same time being without meat or drink, and sparingly shielded from the inclemency of the weather, by clothes drenched in oil,—were incapacitated from taking advantage of the only chance they had ever had of success from the commencement of the chase; they did, it is true, make the attempt, but their efforts were too feeble to be of any service.

By this time we had reached the boats with the ship. The wind had increased to a gale, and a considerable sea had arisen. We had no hope, therefore, of success. As, however, we could not possibly recover the lines at this time, stormy as the weather was, we applied a cask as a buoy to support them, and moored an empty boat having a jack flying in it, to the cask, with the intention of keeping near it during the storm, and with the expectation of recovering our lines, and a faint hope of likewise

gaining the fish, after the termination of the gale. The boat was then abandoned, and all hands, fatigued and oppressed with hunger and thirst, and some with cold, were safely, but not without difficulty, taken on board the ship, at the expiration of $15\frac{3}{4}$ hours of unremitting labour, under circumstances particularly unfavourable.

We made an attempt to keep near the boat with the ship; but the increasing force of the gale, drove us, in spite of every effort, about 20 miles to leeward. On the first cessation we made all sail, and plyed towards the boat; and although the weather was constantly foggy, we succeeded in finding it, recovered boat and lines, but lost the whale. This disagreeable and unsuccessful adventure, occupied between three and four days.

3. *Two Whales struck at the same moment, unexpectedly captured.*—When engaged in the pursuit of a large whale, it is a necessary precaution for two boats at all times to proceed in company, that the one may be able to assist the other, on any emergency. With this principle in view, two boats from the Esk were sent out in chase of some large whales, on the 13th of June 1814. No ice was within sight. The boats had proceeded some time together, when they separated in pursuit of two whales, not far distant

from each other; when, by a singular coincidence, the harpooners each struck his fish at the same moment. They were a mile from the ship. Urgent signals for assistance were immediately displayed by each boat, and in a few minutes one of the harpooners was under the necessity of slipping the end of his line. Fortunately the other fish did not descend so deep, and the lines in the boat proved adequate for the occasion. One of the fish being then supposed to be lost, five of the boats out of seven attended on the fish which yet remained entangled, and speedily killed it. A short time afterwards, the other fish supposed to be irrevocably lost, was descried at a little distance from the place where it was struck;—three boats proceeded against it;—it was immediately struck, and in twenty minutes also killed. Thus were fortunately captured two whales, both of which had been despaired of. They produced us near 40 tons of oil, value, at that time, 1400*l.* The lines attached to the fish last killed, were recovered in a remarkable manner. The harpooners were busily engaged in attempting to secure them, when the harpoon, by which alone they were prevented from sinking, slipped out; but as it descended in the water, it luckily hooked the lines belonging to another boat, by which both harpoon and lines were preserved.

4. *A Fish captured after being Twice Lost.*—An Aberdeen whaler cruising in Greenland, towards the close of the fishing-season of the year 1814, met with a whale, which one of the harpooners struck. Stormy weather commencing, obliged them to cut the line. The next day a fish was struck, which proved to be the same, but which again escaped them; "and on the following day, the identical fish came up at the ship's bow, blew vehemently, was again struck, and in half an hour was secured."

5. *A curious Circumstance in the Fishery.*—It is very generally believed by the whalers, that fish have occasionally been struck, which, by a sudden extension or heave of the body, have instantly disengaged themselves from the harpoon. This case usually happens when the whale is struck "with a slack back," as that position of the fish is denominated, in which the back being depressed, the flesh is relaxed. A harpoon then struck, occasions an uncommon wound. Hence, if the fish suddenly extends itself, and elevates its back, the wound appears of twice the size of the harpoon; and consequently the weapon is capable of being thrown out by the jerk of the body.

Under such circumstances as these, a large whale was struck by a harpooner belonging to the ship

Howe of Shields. On the fish extending and lifting its back with uncommon violence, the harpoon was disengaged, and projected high into the air, when, at the same moment, the fish rolled over upon its back, and received the point of the falling weapon in its belly, whereby it was entangled and caught! This circumstance, romantic as it may appear, is so well authenticated by the person who struck the fish, together with others who were in the boat at the time, and were witnesses of the fact, that I have no scruple in introducing it here.

6. *Capture of a Fish which survived forty Hours after being struck.*—On the 28th of May 1817, the Royal Bounty of Leith, Captain Drysdale, fell in with a great number of whales in the latitude of 77° 25′ N., and longitude 5° or 6° E. Neither ice nor land was in sight, nor was there supposed to be either the one or the other within 50 or 60 miles. A brisk breeze of wind prevailed, and the weather was clear. The boats were therefore manned and sent in pursuit. After a chase of about five hours, the harpooner commanding a boat, who, with another in company, had rowed out of sight of the ship, struck one of the whales. This was about 4 A. M. of the 29th. The captain supposing, from the long absence of the two most distant boats, that a fish had been struck,

directed the course of the ship towards the place where he had last seen them, and about 8 A. M. he got sight of a boat which displayed the signal for being *fast*. Some time afterwards, he observed the other boat approach the fish, a second harpoon struck, and the usual signal displayed. As, however, the fish dragged the two boats away with considerable speed, it was mid-day before any assistance could reach them. Two more harpoons were then struck,—but such was the vigour of the whale, that although it constantly dragged through the water four to six boats, together with a length of 1600 fathoms of line, which it had drawn out of the different boats, yet it pursued its flight nearly as fast as a boat could row; and such was the terror that it manifested on the approach of its enemies, that whenever a boat passed beyond its tail, it invariably dived. All their endeavours to *lance* it were therefore in vain. The crews of the loose boats being unable to keep pace with the fish, caught hold of and moored themselves to the fast-boats, and for some hours afterwards, *all hands* were constrained to sit in idle impatience, waiting for some relaxation in the speed of the whale. Its most general course had hitherto been to windward, but a favourable change taking place, enabled the ship, which had previously been at a great distance, to join the boats at 8 P. M. They succeeded in taking one of the lines to the ship, which was fast to the fish, with a view of re-

tarding its flight. They then furled the top-gallant-sails, and lowered the top-sails; but after supporting the ship a few minutes, head to wind, the wither of the harpoon *upset*, or twisted aside, and the instrument was disengaged from its grasp. The whale immediately set off to windward with increased speed, and it required an interval of three hours before the ship could again approach it. Another line was then taken on board, which immediately broke. A fifth harpoon had previously been struck, to replace the one which was pulled out, but the line attached to it was soon afterwards cut. They then instituted various schemes for arresting the speed of the fish, which occupied their close attention nearly twelve hours. But its velocity was yet such, that the master, who had himself proceeded to the attack, was unable to approach sufficiently near to strike a harpoon. After a long chase, however, he succeeded in getting hold of one of the lines which the fish dragged after it, and of fastening another line to it. The fish then fortunately turned towards the ship, which was at a considerable distance to leeward. At 4 P. M. of the 30th, 36 hours after the fish was struck, the ship again joined the boats; when, by a successful manœuvre, they secured two of the fast-lines on board. The wind blowing a moderately brisk breeze, the top-gallant-sails were taken in, the courses hauled up, and the top-sails clewed down; but notwithstanding the resistance a ship thus situated must necessarily offer, she was

towed by the fish directly to windward, with the velocity of at least 1½ to 2 knots, during an hour and a half. And then, though the whale must have been greatly exhausted, it beat the water with its fins and tail in so tremendous a way, that the sea around was in a continual foam, and the most hardy of the sailors scarcely dared to approach it. At length, about 8 P. M. after 40 hours of almost incessant, and for the most part fruitless exertion, this formidable and astonishingly vigorous animal was killed. The capture and the flensing occupied 48 hours! The fish was 11 feet 4 inches bone (the length of the longest lamina of whalebone); and its produce filled 47 butts, or 23½ ton casks with blubber*.

SECT. X.

Proceedings of the Fishers after a Whale is Killed.

BEFORE a whale can be *flensed*, as the operation of taking off the fat and whalebone is called, some preliminary measures are requisite. These consist in securing the fish to a boat, cutting away the attached whale-lines, lashing the fins of the whale together, and towing it to the ship.

* This interesting occurrence was communicated to me by the *late* Captain of the Royal Bounty, in a letter containing the account of the transaction, as inserted in his log-book.

The first operation performed on a dead whale, is to secure it to a boat. This is easily effected, by lashing it with a rope, passed several times through two holes pierced in the tail, to the boat's bow. The more difficult operation of freeing the whale from the entanglement of the lines, is then attempted. As the whale, when dead, always lies on its back or on its side, the lines and harpoons are generally far under water. When they are seen passing obliquely downward, they are hooked with a grapnel, pulled to the surface, and cut. But when they hang perpendicular, or when they cannot be seen, they are discovered by a process called "sweeping a fish." This is performed by taking a part of a whale-line in two different boats, ten or fifteen fathoms asunder; and while one boat lies at rest supporting the end of the line, the other is rowed round the fish, and the *bight*, or intermediate part of the line, allowed to sink below the fish as it proceeds, until each of the parts held in the two boats are again brought together. Hence, when one part of the line has made a circuit of the fish, it must evidently enclose every other line or appendage affixed to it. Thus enclosed, they are pulled up to the surface of the water, and each of them cut at the splice of the foreganger; leaving the harpoon sticking in the fish with its foreganger attached, and allowing the end of the line to sink, and be hauled on board of the boat, from whence it

was withdrawn, at the convenience of the crew. While this is in progress, the men of other boats having first lashed the tail to a boat, are employed in lashing the fins together across the belly of the whale. I have observed two or three curious circumstances connected with these operations, which I shall venture to mention.

On one occasion, I was myself engaged in the capture of a fish, upon which, when to appearance dead, I leaped, cut holes in the fins, and was in the act of "reeving a rope" through them, to lash them together, when the fish sunk beneath my feet. As soon as I observed that the water had risen above my knees, I made a spring towards a boat, at the distance of three or four yards from me, and caught hold of the gunwale. Scarcely was I helped on board, before the fish began to move forward, turned from its back upon its belly, reared its tail aloft, and began to shake it with such prodigious violence, that it resounded through the air to the distance of two or three miles. In the mean time, all the sailors, very properly, kept aloof, and beheld its extraordinary powers with the greatest astonishment. After two or three minutes of this violent exercise, it ceased, rolled upon its side, and died.

In the year 1816, a fish was, to all appearance, killed by the crew of the Esk. The fins were partly lashed, and the tail on the point of being secured, and all the lines excepting one, were cut

away, the fish meanwhile lying as if dead. To the surprise and great alarm, however, of the sailors, it revived, began to move, and pressed forward in a convulsive agitation; soon after it sunk in the water to some depth, and then died. One line fortunately remained attached to it, by which it was drawn to the surface and secured.

On a former occasion, my harpooners had killed a fish and cut off the lines, when, though actually dead, it being less buoyant than whales usually are, immediately sunk. It would have been altogether lost, had not one of the harpooners, with great presence of mind and alacrity, seized a harpoon, and driven it with a powerful stroke under water, which had the good fortune to penetrate the head, though one of the most difficult parts to pierce, whereby the fish was recovered.

A fish being properly secured, is then "taken in tow;" that is, all the boats join themselves in a line, by ropes always carried for the purpose, and unite their efforts in rowing towards the ship. The course of the ship in the mean time, is usually directed towards the boats. But in calms, or when the ship is moored to the ice at no great distance, or when the situation of the fish is inconvenient or inaccessible, the ship awaits the approach of the fish. Towing a fish is usually considered a cheerful, though laborious operation, and is generally per-

formed with great expressions of joy. A large whale, by means of six boats, can be towed at the rate of nearly a mile *per* hour.

The fish having reached the ship, is taken to the *larboard* side, arranged and secured for flensing. For the performance of this operation, a variety of knives and other instruments are requisite, most of which are figured in Plates 18, 20, and 21.

Towards the stern of the ship the head of the fish is directed; and the tail, which is first cut off, rests abreast of the fore-chains. The smallest or posterior part of the whale's body, where the tail is united, is called the *rump*, and the extremity or anterior part of the head, the *nose*, or *nose-end*. The rump then, supported by a tackle, is drawn forward by means of a stout rope, called the *rump-rope*, and the head is drawn in an opposite direction by means of the "nose-tackle." Hence, the body of the fish is forcibly extended. The right-side fin, being next the ship, is lashed upward towards the gunwale. A band of blubber, 2 or 3 feet in width, encircling the fish's body, and lying between the fins and the head, being the fat of the neck, or what corresponds in other animals with the neck, is called the *kent*; because, by means of it, the fish is turned over or *kented*. Now, to the commencement of this imaginary band of fat or kent, is fixed the lower extremity of a combination of powerful blocks, called the *kent-purchase*. Its upper extremity is fix-

ed round the head of the main-mast, and its *fall* or rope is applied to the windlass, drawn tight, and the upper surface of the fish raised several inches above the water. The enormous weight of a whale, prevents the possibility of raising it more than one-fourth or one-fifth part out of the water, except, indeed, when it has been some days dead, in which case it swells, in consequence of air generated by putrefaction, until one-third of its bulk appears above the surface. The fish then lying belly upward, extended and well secured, is ready for commencing the operation of flensing. In this state, a suspension of labour is generally allowed, in which the crew get themselves refreshed with food and a dram, and equip themselves suitably for the ensuing duties.

An unlucky circumstance once occurred in an interval of this kind. At that period of the fishery, (40 or 50 years ago,) when a single stout whale, together with the bounty, was found sufficient to remunerate the owners of a ship for the expences of the voyage, great joy was exhibited on the capture of a whale, by the fishers. They were not only cheered by a dram of spirits, but sometimes provided with some favourite " mess," on which to regale themselves, before they commenced the arduous task of flensing. At such a period, the crew of an English vessel had captured their first whale. It was taken to the ship, placed on the lee-side, and though the wind blew a strong breeze, it was fastened only by a small rope

attached to the fin. In this state of supposed security, all hands retired to regale themselves, the captain himself not excepted. The ship being at a distance from any ice, and the fish believed to be secure, they made no great haste in their enjoyment. At length, the speeksioneer having spent sufficient time in indulgence and equipment, with an air of importance and self-confidence, proceeded on deck, and naturally turned to look on the whale. To his astonishment it was not there. In some alarm he looked a-stern, a-head, on the other side, but his search was useless; the ship drifting fast, had pressed forcibly upon the whale, the rope broke, the fish sunk and was lost! The mortification of this event may be conceived, but the termination of their vexation will not easily be imagined, when it is known, that no other opportunity of procuring a whale occurred during the voyage. The ship returned home *clean.*

SECT. XI.

Process of Flensing.

After the whale is properly secured along side of the ship, and the men sufficiently refreshed, the harpooners, having their feet armed with "spurs," (Pl. 20. fig. 15.) to prevent them from slipping,

descend upon the fish. Two boats, each of which is under the guidance of one or two boys, attend upon them, and serve to hold all their knives and other apparatus. Thus provided, the harpooners, directed by the specksioneer, divide the fat into oblong pieces or "slips," by means of "blubber-spades," (Pl. 18. fig. 7, 8, 9, 10.) and "blubber-knives," (Pl. 20. fig. 1.); then affixing a "speck-tackle" to each slip, progressively flay it off, as it is drawn upward. The speck-tackles, which are two or three in number, are rendered effective by capsterns, winches, or other mechanical powers. Each of them consists of a simple combination of two single blocks, one of which is securely fixed on a strong rope, extended between the main-top and the fore-top, called a *guy*; and the other is attached by a *strap* to the blubber of the whale. The *flensers* commence with the belly and under jaw, being the only parts then above water. The blubber, in pieces of half a ton to a ton each, is received upon deck by the boat-steerers and line-managers: the former with "strand-knives," (Pl. 20. fig. 3.) divide it into portable cubical, or oblong pieces, containing near a solid foot of fat, while the latter, furnished with "pick-haaks," (Pl. 20. fig. 9.) pass it between decks, down a hole in the main hatches. It is then received by two men styled *kings*, who pack it in a receptacle provided for it in the hold, or other suitable place,

called the *flens-gut*, where it remains until further convenience.

All the fat being taken away from the belly, and the right fin removed, the fish is then turned on its side by means of the kent, which, by the power of the windlass, readily performs this office. The upper surface of fat is again removed, together with the left fin, and after a second kenting, one of the "lips" is taken away, by which, the whalebone of one side of the head, now lying nearly horizontal, is exposed. The fish being a little further turned, the whalebone of the left side is dislodged by the use of "bone hand-spikes," (Pl. 21. fig. 6.) "bone-knives," and "bone-spades." Four of the articles represented by fig. 5. Pl. 20., which, when combined, constitute what is called the *bone-geer*, are used, with the assistance of two speck-tackles, for taking up the whalebone in one mass. On its arrival on deck, it is split with "bone-wedges" (Pl. 20. fig. 6.) into "junks," containing 5 to 10 blades each, and stowed away. A further kenting brings the fish's back upward, and the next exposes the second side of bone. As the fish is turned or kented round, every part of the blubber becomes progressively uppermost, and is removed. At length, when the whole of the blubber, whalebone, and jaw-bones, have been taken on board, the kent, which now appears a slip of perhaps 30 feet in length, is also separated, together with the rump-rope and nose-

tackle, on which, the carcass being at liberty, generally sinks in the water and disappears *. When it floats, however, it becomes food for bears, sharks, and various kinds of birds, all of which attack it with most voracious earnestness.

When sharks are present, they generally take the liberty of helping themselves very bountifully during the progress of the flensing; but they often pay for their temerity, with their lives. Fulmars pay close attendance in immense numbers. They seize the fragments occasionally disengaged by the knife, while they are swimming in the water; but most of the other gulls who attend on the occasion, take their share on the wing. The burgomaster is decidedly the master of the feast. Hence every other bird is obliged to relinquish the most delicious morsel, when the burgomaster descends to claim it. Bears seldom approach so near the ship, as to become partakers of the banquet.

When dispatch is seconded by ability, the operation of flensing can be accomplished on a fish affording 20 to 30 tons of blubber, in the space of three or four hours. Probably the average time with British fishers but little exceeds four hours.

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* When a whale has been 24 to 48 hours killed, its *kreng*, as the carcass after being flensed is called, becomes so swollen by the air generated by the process of putrefaction, that it will swim; and, in a few days after death, will rise three or four feet above the surface of the water.

But I have observed a foreign ship nearly 24 hours in flensing a whale! This dilatoriness was occasioned by inexperience, and indifferent weather, in combination with an indulgence of ease, amounting to idleness.

The process by which a small fish is flensed, is a little different from the preceding; inasmuch as the preparations are less formal, and the labour less arduous.

Flensing in a *swell* is a most difficult and dangerous undertaking; and when the swell is at all considerable, it is commonly impracticable. No ropes or blocks are capable of bearing the jerk of the sea. The harpooners are annoyed by the surge, and repeatedly drenched in water; and are likewise subject to be wounded by the breaking of ropes or hooks of tackles, and even by strokes from each others knives. Hence accidents in this kind of flensing, in particular, are not uncommon. The harpooners not unfrequently fall into the fish's mouth, when it is exposed by the removal of a surface of blubber; where they might easily be drowned, but for the prompt assistance which is always at hand.

Some years ago, I was witness of a circumstance, in which, a harpooner was exposed to the most imminent risk of his life, at the conclusion of a flensing process, by a very curious accident. This harpooner stood on one of the jaw-bones of the fish, with a

boat by his side. In this situation, while he was in the act of cutting the kreng adrift, a boy inadvertently struck the point of the boat-hook, with which he usually held the boat, through the ring of the harpooner's spur; and, in the same act, seized the jaw-bone of the fish with the hook of the same instrument. Before this was discovered, the kreng was set at liberty, and began instantly to sink. The harpooner then threw himself towards the boat; but being firmly entangled by the foot, he fell into the water. Providentially, he caught the gunwale of the boat with his hands: but, overpowered by the force of the sinking kreng, he was on the point of relinquishing his grasp, when some of his companions got hold of his hands, while others threw a rope round his body. The carcass of the fish was now suspended entirely by the poor fellow's body, which was consequently so dreadfully extended, that there was some danger of his being drawn asunder. But such was his terror of being taken under water, and not indeed without cause, for he could never have risen again, that notwithstanding the excrutiating pain he suffered, he constantly cried out to his companions to "haul away the rope." He remained in this dreadful state, until means were adopted for hooking the kreng with a grapnel, and drawing it back to the surface of the water. His escape was singularly providential: for, had he not caught hold of the boat as

he was sinking, and met with such prompt assistance, he must infallibly have perished.

SECT. XII.

Process of Making Off.

When a fish is caught, or sometimes when there is a good prospect of success in the fishery, even before a fish is caught, the centre of the ship's hold is disencumbered of a few of its casks, to be in readiness for the reception of the blubber. The cavity thus made, together with all the space between decks which can conveniently be appropriated to the same purpose, receives the name of the *flens-gut.* Now, when the flens-gut is filled with blubber, or when, no fish being seen, a favourable opportunity of leisure is presented, the operation of *making off** is generally commenced. This consists of freeing the fat from all extraneous substances, especially the muscular parts, and the skin; then cutting it into small pieces, and putting it into casks through the bung-holes.

* The expression "making off," seems to be derived from the word *afmaaken* of the Dutch, signifying to finish, adjust, or complete, referring to the nature of the operation,—as a concluding, finishing, or adjusting process.

Before the process of making-off can, however, be commenced, several preparatory measures are necessary. The ship must be moored to a convenient piece of ice, or placed in an open situation, and the sails so reduced as to require no further attention in the event of bad weather occurring. The hold of the ship must be cleared of its superstructure of casks, until the "ground-tier," or lowest stratum of casks, is exposed; and the ballast-water must be "started," or pumped out of all the casks that are removed upon deck, as well as out of those in the ground-tier, which are first prepared for the reception of the blubber. In "breaking out the hold," it is not necessary to lay open more of the ground-tier at a time, than three or four casks extend in length.

The water which is discharged from the casks in the hold, provided they have been before in use, gives out a great quantity of a strong disagreeable vapour, consisting probably of sulphuretted and phosphuretted hydrogen, with a mixture of other gaseous fluids, produced by the decomposition of the oleaginous, and other animal substances, left in the casks after former voyages. This decomposition seems to be encouraged, if not wholly produced, by the action of the water on the animal matter; because the same casks, if bunged close, when empty, give out but a small quantity of gas, and that of inferior pungency. The gas proceeding from oily casks,

having contained water, resembles, in some degree, though vastly more pungent, the gas evolved by "bilge-water," or the stagnant water which rests among the timbers of a very tight ship. The gas discharged from oily casks, is usually stronger and more abundant, in proportion as the water from which it is disengaged, has been a longer time in the casks. A considerable quantity of it is generated, in the space of three or four months. This gas blackens metals, even gold, restores some metallic oxides, is disagreeable in respiration, and affects the eyes of the persons employed in the hold, where it is most abundant, so as to occasion ophthalmic inflammation, and frequently temporary blindness.

While the line-managers, together with the "skeeman*," the cooper, and perhaps a few others, are employed in breaking out the hold, the rest of the crew on the deck arrange all the variety of apparatus used for the preparation of the blubber, before it is put into the casks. Of this apparatus, the most considerable part is the "speck-trough," with its appendages. It consists of a kind of oblong box or chest, about twelve feet in length, $1\frac{3}{4}$ feet in breadth, and $1\frac{1}{2}$ feet in depth. The speck-trough is fixed upon the deck, as nearly

* The officer who has the direction of operations conducted in the hold.

as possible over the place where the casks are to be filled in the hold. A square hole, made in its bottom, is placed either over the nearest hatch-way to the scene of operations, or upon a corresponding hole, cut in the deck.

The speck-trough is then secured, and its lid turned backward into an horizontal position; in which position it is supported on one side by its hinges, and on the other, by screw props or pillars; or it is altogether rested upon several little stools. The surface of the lid, which, thus placed, forms a level table, is then covered with blocks of whales' tail, from end to end. This substance, from its sinewy and elastic nature, makes excellent "chopping-blocks," and preserves the "chopping-knives" from injury, when used for dividing the blubber upon it. Into the square-hole in the bottom of the speck-trough, is fitted an iron-frame, to which is suspended a canvas tube or "hose," denominated a *lull*. The lull is open at both ends. Its diameter is about a foot, and its length sufficient to reach from the deck to the bottom of the hold. To the middle, or towards the upper part of the lull, is attached a "pair of nippers," consisting of two sticks fastened together, by a kind of hinge at one end, and capable of being pressed together at the other. The nippers being passed across the body of the lull, and their detached extremities brought together, they embrace it so closely, that nothing can pass downward while they

remain in this position; but when, on the other hand, the nippers are extended, the lull forms a free channel of communication between the speck-trough and the hold.

Every thing being now in readiness, the blubber, as it is thrown out of the flens-gut by the *kings*, undergoes the following several operations. It is received upon deck by the "krengers," whose office is to remove all the muscular parts, together with such spongy or fibrous fat, as is known by experience to produce very little oil. When these substances, which go under the general denomination of Kreng, are included among the blubber in the casks, they undergo a kind of fermentation, and generate such a quantity of gas, as sometimes to burst the containing vessels, and occasion the loss of their contents. From the krengers, the blubber passes to the harpooners. Each of these officers, provided with a blubber-knife or a strand-knife, places himself by the side of a "clash" (Pl. 20. fig. 10.) fixed in the deck. An attendant, by means of a pair of "hand-hooks," (Pl. 19. fig. 3.) or "a pick-haak," (Pl. 20. fig. 9.) then mounts a piece of blubber upon the spikes of the clash, and the harpooner slices off the skin. From the skinners, the blubber is passed into an open space called the *bank*, prepared as a depository, in front of the speck-trough, and it is then laid upon the "chopping-blocks," as wanted. It now falls under the hands of the boat-

steerers, who, armed with "chopping-knives," (Pl. 20. fig. 2.) are arranged in a line by the side of the chopping-blocks, with the speck-trough before them. Thus prepared, they divide the blubber, as it is placed on their blocks, into oblong pieces, not exceeding four inches in diameter, and push it into the speck-trough intended for its reception. And, finally, the blubber falls under the direction of the line-managers stationed in the hold, who receive it into tubs, through the medium of the lull, and pass it, without any instrument but their hands, into the casks through their bung-holes. When the line-manager brings his tub beneath the lull, he makes use of the words "let lob," on which the boy who holds the *nippers*, permits the blubber to escape, until he is warned by the words "nip the lull," or "nip," to prevent any more from descending. When a cask is nearly filled, the packing is completed by the use of a "pricker" (Pl. 18. fig. 11, 12.); one piece after another being thrust in by this instrument, until it can contain no more. It is then securely bunged up.

An excellent apparatus for cutting blubber, has been recently introduced, which promises in a few years to supersede the use of the speck-trough and its cumbrous appendages. It consists of a square tube of wood, 5 or 6 feet in length, and about 16 or 18 inches square. An iron frame containing four cutting knives, placed parallel to one ano-

ther, with their edges upward, is fixed on friction-rollers near the bottom of the tube; and immediately below this frame another exactly similar is placed at right angles. The knives of the two frames, therefore, divide the cavity of the tube into 25 exact squares. In Plate 22., are two representations of this apparatus. Figure 1, shows the instrument in its proper position; and fig. 2. is a horizontal section of the same. When it is in use, the blubber to be cut is put into the tube at the top, and falls upon the edges of the knives. The knives are then put into rapid horizontal motion, by which the blubber is readily cut into proper sized pieces, falls into the *lull* attached to the bottom of the machine, is conducted into the hold, and disposed of in the same manner as before described. No other pressure besides the weight of the blubber, is requisite for forcing it through the machine; but to assist the action of the knives, their edges are sometimes made higher at the middle than at the ends.

When the ground tier-casks, as far as they have been exposed, are filled, the second tier of casks is "stowed" upon it, and likewise filled with blubber, together with the third tier-casks, when necessary. As in this progressive manner, when fish can be had in sufficiency, all the hold is filled, and likewise the space between decks,—it is evident, that the process of making-off must be tedious, disagreeable and

laborious. Fifty men actively employed, can prepare and pack about three tons of blubber in an hour; though more frequently they are contented with making-off little more than one-half of that quantity *. When a ship, which makes a successful fishing, is deficient in casks, the remaining vacancies adapted for the reception of the cargo, are filled with "blubber in bulk;" that is, the blubber, in large pieces as it is taken off the whales, is laid skin downward, upon the highest tier of casks, and over this, stratum after stratum, until the vacancies are filled. A little salt is usually scattered over the surface of each stratum of blubber, which assists in preserving the animal fibre, and in preventing the discharge of the oil. Blubber in bulk, notwithstanding every precaution, however, generally loses much of its oil. A quick passage homeward, with cool weather and smooth sea, are favourable for its preservation; but under the influence of opposite circumstances, it becomes greatly reduced.

* The operation of making-off, was always, in the early ages of the fishery, performed on shore; and even so recently as the middle of last century, it was customary for ships to proceed into a harbour, and there remain so long as this process was going

SECT. XIII.

Laws of the Whale-Fishery.

WHEREVER a number of individuals in different interests, but under similar circumstances of time and place, are embarked in the same traffic or occupation, their advantages generally clash with each, or at least interfere in such a way that they are liable to strive to promote their own advantage on every occasion, though it be at the expence of their neighbour. The generality of this fact in a greater or less degree, has induced some manufacturers, merchants, and tradespeople, to establish among themselves, where the Legislature has omitted it, a suitable, and, as nearly as possible, an equitable system of regulations, for their mutual benefit.

Thus, in the Greenland Whale-fishery, the importance of a code of laws was, at a very early period, apparent. A fish struck by the people of two different ships, became an object of dispute, the first striker claiming the whole, and the second demanding a share for his assistance. Stores saved from wrecked vessels, and especially the cargoes of wrecks, being objects of much moment, were also liable to occasion disputes in a still higher degree. Hence, about the year 1677, the Dutch issued a code of regulations, founded on equitable principles, for the prevention of quarrels

and litigation among the fishers, to which all persons interested in the trade were expected to conform. But as these regulations, from their want of authority, were not sufficiently observed,—and indeed, in their original form, were found to be subject to some difficulties,—the States-General of Holland and West Friesland, in the year 1695, as appears from a resolution dated the 25th of January of the same year, approved and confirmed (after revision) the general regulations with respect to the saving of the crews and stores of vessels wrecked in the ice, the right to whales under peculiar circumstances, and other matters connected with the fishery. To these regulations, every captain, speksioneer and officer concerned in the fishery, was obliged to subscribe. They consisted of twelve articles, in substance as follows *.

1. Whenever a ship is lost, and the captain and crew endeavour to save themselves, the first vessel they approach shall be bound to take them on board; whenever this ship meets with another, this other shall take one-half of the men who have been saved, except only in case the ship met with shall happen to have already any other shipwrecked seamen on board; in the event of which, the number in each ship shall be summed up and equally di-

* "Beschryving der Walvisvangst," &c. Deel i. bl. 22; also "Histoire des Pêches," Tome i. p. 427.

vided between the two: And whenever either of those ships shall meet with a third, they shall again divide with her, one-half of their shipwrecked seamen; and thus continue subdividing with every ship they meet, until they become equally distributed throughout the fleet, or at least until the number left be so far diminished, as to cease to be a burden to the savers.

2. The victualling stores of the people saved, shall be exclusively consumed by themselves; and when any division of the shipwrecked crew is made to any other vessels, an equal proportion of the remaining victuals must go along with them; but in the event of the said crew not having brought any provisions along with them, then they shall be assisted therewith, for humanity's sake, they working for the same as other seamen.

3. Whenever a ship shall be cast away in Greenland, the commander or captain, or the person representing the same, so long as he remains by the wreck, shall have his free choice whether the stores shall be saved or not, and by whom they shall be saved, provided the person on whom he fixes shall have it at his option to receive them.

4. In all instances, however, of a wreck being found without any person near or on board the same, he or they who shall meet with it, shall be legally authorised to take on board any of its stores, spars, rigging, sails, casks, cargo or goods; and on carrying

the same home, he (the saver) or the owners of his vessel, shall be entitled to one equal half thereof, and the remaining moiety, without any charge or expence whatsoever, shall be given up to the original proprietors.

5. When it happens that a wreck is abandoned by the captain, officers and crew, and the stores, cargo and goods belonging to it are afterwards saved,—the captain, officers and crew, so deserting the wreck, shall not have any claim whatever on the goods so saved, any more than if they had been totally lost.

6. But the crew of the ship lost, or any part thereof, who may be present at the time any stores, or any part of the cargo, shall be saved, and shall assist in saving them, shall, out of the neat fourth part of all that may be saved, receive the monthly wages due to them at the time the ship was lost; but, in the event the one-fourth part should be inadequate for this purpose, each individual shall sustain an equal proportion of the existing deficiency; and if the said one-fourth should exceed the sum requisite for paying the monthly wages as above, the surplus shall be added to the remaining three-fourths, as the equal and joint property of the savers and the owners of the wrecked vessel.

7*. The commander by whom any thing is saved, shall calculate the value thereof, (deducting that part required for paying the monthly wages of the shipwrecked crew, as in the last article) and comparing the said value or capital thus arising with the market price of train-oil and whalebone, he shall pay his officers and crew in like proportion, as they would have been entitled to, had the same value of oil and fins been obtained in the fishery:— In this estimate of the value of the goods saved, when rendered into their corresponding proportion of oil and fins, he shall reckon 50 barrels of blubber and 1600 lb. of whalebone as one fish.

8. All goods thus saved from wrecks, shall, in case of damage being received by the saving vessel, be subject to average the same as all other property in the ship †.

9. Any one having killed a whale in the ice, but who cannot conveniently take it on board, shall be considered as the owner thereof, so long as any of his crew remains along with it; but whenever it is deserted, though made fast to a piece of

* In the French, this article is rendered totally different, and to me is quite unintelligible; in the Dutch it is also ambiguous: but I flatter myself, I have conveyed pretty nearly the meaning of it.

† The cargoes of Dutch ships probably became liable to general averages, in consequence of their frequently using hired ships for the whale-fishery.

ice, it becomes the property of the first who can get possession of it *.

10. But if a fish be made fast to the shore, or moored near the shore by means of a grapnel or anchor, with a buoy, a flag, or other mark attached to it, signifying that it is not deserted,—the person who left it there, shall still be considered the sole proprietor, though no person may be with it.

11. Any person being wounded or maimed in defensive operations, while in this service, either in the passage to or from Greenland, shall receive a reasonable compensation from the Commissioners of the fishery, according to the injury sustained, and the degree of zeal and bravery manifested on the occasion; the expence of which to be borne by the whole fleet.

12. Lastly, if a case shall happen which is not provided for by these regulations, it shall be settled by reference to wise and prudent arbitrators.

(Signed) SIMON VAN-BEAUMONT, &c.

The above articles being duly announced, were enforced by commissioners chosen from amongst the principal Greenland owners of Holland, for conducting and carrying into effect, this and other matters

* The latter part of this article is omitted in the French, and a sentence of a similar signification with the former part substituted.

connected with the prosperity and regulation of the fishery.

Besides the preceding regulations, which were subscribed to on oath by every fishing captain and chief officer before sailing, there was another set of rules adapted for the crews of each ship, to the observance of which, every man was sworn before one of the Commissioners, who went on board of each ship to administer the oath.* This affidavit was a kind of charter-party, importing, that they would attend prayers morning and evening, on pain of an amercement at the discretion of the captain; that they would not get drunk or draw their knives, on forfeiture of half their wages; and that they would not fight on forfeiture of the whole. That no one should lay wagers on the good or ill success of the fishing, nor buy or sell on these conditions, in case they took one or more fish, on penalty of 25 florins; that they would be contented with the provision allowed them, and that they would never light fire, candle or match, by night or day, without the captain's leave, under the same penalty*.

Among the British whale-fishers, it does not appear that any particular laws were ever expressly laid down, for the adjusting of differences; yet custom has established certain principles, as constituting the rule of right, the legality of which is sufficiently ac-

* Reece's Cyclopædia, Art. *Fishery*.

knowledged, by their being universally respected. The fundamental articles are two.

First, That a fast-fish, or a fish in any way in possession, whether alive or dead, is the sole and unquestionable property of the persons so maintaining the connection or possession; and, secondly, That a loose fish, alive or dead, is fair game.

The first of these regulations is founded in equity, and needs no modification; but the second can only be recommended for its simplicity, as it sometimes decides contrary to the apparent principle of right. Its simplicity, however, must be considered as of great moment, when its frequent application in the whale-fishery is known; because, from this excellence, it is so readily understood, that it has a tendency to prevent a great deal of litigation, to which a more limited and modified construction might render it liable.

1. Under the first law, whenever a fish is struck, it becomes the sole indisputable property of the people by whom it was struck, and it remains their property so long as they retain their connection with it, through the medium of their lines and harpoons; but whenever the continuity of the line is broken, no matter by what means, the fish is esteemed *loose*.

When a fish is struck, and the harpoon draws out, if either the line or the harpoon were only to lie across its back, the fish would still be considered as fast.

If a fish, which can be said to be fast, no matter how slightly, were struck again, and killed by the people of any other ship, excepting that of the original striker, they would not have the least claim upon the fish on account of the assistance given; nay, even if the first fast-harpoon should drop out, or the line should break, an instant after another ship's people had struck a harpoon, the fish would still be the sole prize of the original striker. Hence, the only question which is liable to be disputed, is, Whether the fish, at the time of being harpooned by the second ship, was fast or loose? In disputes of this nature, it is the business of the original striker to identify the fish in dispute, which can generally be done by the wound of the harpoon; but as he must be always considered as fast, so long as his jack is continued flying in the boat and ship, it becomes the part of the second claimant to prove the contrary. To prove a fish to have been loose at a certain moment of time, however, is generally a matter of difficulty, though every one may be convinced of the fact; for who can say, though no harpoon or line was visible, that the line or harpoon was not adhering to the fin, tail, belly, or other concealed part of the fish?

The same law holds with a dead fish as with a living one; a dead fish being the sole and unquestionable property of the person who maintains the possession

A fish may be said to be in possession, whenever it is connected, by any rope, pole, staff, or any other similar controllable* medium, to a ship, or to a boat containing one or more of her crew, or to or with any individual belonging to the crew of the said ship, whether he be in a boat, or on the ice, or even in the water. Thus, if a fish be fast by a harpoon and line, or a line without a harpoon,—by a man resting upon the fish, or touching it in any part, though he be in the water himself, or upon a piece of ice,—by having a man holding it with a boat-hook, a cord, a lance, or any other article,—or, indeed, by a man either holding one end of any article which touches the fish with the other, or being in a boat with whose lines one end of such article is connected,—the fish thus circumstanced is indisputably in possession. But no boat, or any number of boats connected with the fish, in the most secure manner, where no person is with them, can secure the possession of the fish, for even these boats themselves appear to be in some measure free prizes; at least, under such circumstances boats have, occasionally, been peremptorily detained.

* I use the word *controllable* here, to distinguish the articles meant, from some others, which, though forming a connection, do not establish the possession. For instance, a man may have hold of, or be upon a piece of ice, which, on the opposite side, rests against a fish, or touches it; but though, in this case, there is a kind of connection, the ice, not being under his controul, does not convey the necessary possession.

II. Under the second law; whenever a fish is loose, whatever may be the case or circumstances, it becomes a free prize to the first person who gets hold of it.

Thus, when a whale is killed, and the flensing is prevented by a storm, it is usually taken in tow; if the rope by which it is connected with the ship should happen to break, and the people of another ship should seize upon it while disengaged, it becomes their prize*.

Should the flags of a ship and its fast-boat be struck, on the supposition that their whale has escaped, the same whale may be struck by the people of any other ship who can approach it; and though the case should prove doubtful, whether the fish were really fast or loose at the time, the second striker would have the advantage in his claim, in consequence of the jacks of the first striker being

* Some instances of this kind have, however, occurred, wherein the right of the original proprietors has appeared so evident, that the fish, which might have been perversely detained, was liberally restored. Such was the case, where a ship was towing one dead fish towards another, for the purpose of securing both of them, before the flensing was commenced, when the line broke, and the fish was left a little distance astern. In the interim, before a boat could be dispatched, to regain it, the crew of a strange boat, which happened to be near, seized it, and towed it to their own ship. The case, however, being glaringly inequitable, the fish, after some little altercation, was given up.

taken down, which is considered as an acknowledgment that the fish was loose, and consequently a free prize.

If, when a fish is struck, the lines of the fast-boat should be expended before any assistance arrives, and the men should abandon the boat and betake themselves to the ice, or even to swimming, supported by their oars, while the boat is allowed to be drawn under water, with the hope of securing the fish by the sacrifice,—that moment when the men quit the boat and release it from their grasp, the continuity with the whale is broken, and it is considered to be loose. Hence, though the rest of the boats belonging to the same vessel may immediately arrive, though they may disperse themselves around the spot, remain on watch for the return of the fish to the surface, and assist in killing it, yet, whenever the fish is subdued, it becomes the indisputable prize of the second striker*.

* A remarkable case in point, occurred in the Spitzbergen fishery, about fifteen years ago. Two London ships were in company, near the edge of a field of ice, where several fish were astir. A harpooner belonging to one of them, the Neptune, struck a whale when at a distance from his companions; which, taking his line out, before assistance could reach him, he fastened its end to the boat, and allowed the boat to be taken under water, with the expectation of its being the means of regaining the fish. Boats were sent from the ship in company, with the ostensible view of assisting; from one of which, the whale,

This is a hard case, and appears inequitable. The reason why it is not modified, is, probably, that many fish would be altogether lost which are now captured, whilst a further cause for litigation would be opened. In the present state of the law, for instance, disputes can only relate to the circumstance—fast or loose; but if the law were modified, so that a fish struck by the people of any ship, should be the property of that ship, fast or loose, so long as her boats continued the

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on its first appearance, was struck. All assisted in the capture. The Neptune's people expected it was their prize; but their competitors seized it, when dead, together with the boat and lines that had been drawn under water, and took them, in spite of opposition, to their own ship. The two captains who met to canvass the matter, parted with angry violence: the one refusing to give up the advantage he had so unhandsomely obtained; the other threatening to refer the case to a court of law. On the return of the ships, the case was tried before Lord Ellenborough, when the defendant, having offered to give up the boat, the Jury gave a verdict for the plaintiff, (the owner of the Neptune,) damages one shilling, costs forty shillings. But it was found, that as soon as the crew abandoned the boat, the fish was loose, and consequently a free prize to the defendant. As this important case involves the law with regard to boats, lines, and harpoons, when taken away from the hands of the proprietors by a whale, as well as the law relating to a loose fish, I have, for the satisfaction of whale-fishers, given the trial at some length in the Appendix, No. V., from a communication with which I have been favoured by James Gale, Esq. owner of the Neptune.

pursuit, an additional cause of dispute would occur: for, besides the simple question, Whether the fish was fast or loose? we should have to inquire, Whether the original striker's boats had, or had not, relinquished the pursuit? And, whenever a master observed a fish escape from any neighbouring ship, he would be dubious of striking such fish, or any other, which, from its conduct, he might mistake for the same. Hence, the fear of litigation might operate so forcibly, and, at the same time, so contrary to the economy of the fishery, that a number of wounded whales, and others supposed to be wounded, would escape, which, in the present state of the law, are attacked and captured without scruple.

The same objection holds with regard to any other general alteration in the laws of the fishery, which occurs to me.

The only improvement, therefore, which, on the whole, I conceive, in the present state of things, the law is capable of, is that arising from the application of the golden precept, given by the Saviour of Mankind, "Whatsoever ye would that men should do to you, do ye even so to them.*" This would shew a person, that to attempt to take a fish out of the hands of another is a crime; and to endeavour to seize a fish which has just escaped from its strikers with lines, or with lines and boat, (so long as they

* New Testament, *Matthew*, ch. vii. ver. 12.

have a chance of succeeding in the recapture,) is an act at once mean and despicable. It would also shew him, that nothing could justify such an act, but the certainty, that the original strikers could have little or no chance of ever recovering the possession of the fish themselves. As the application of this maxim, however, must depend upon the integrity of character of those individuals engaged in the transaction, it cannot be expected, in a case where self-interest is so deeply concerned, that it should be universally respected. So liable, indeed, is the judgment to be warped by an interested feeling, that its decisions in such a case are rarely to be depended on, unless the question can be considered abstractly from this prejudicial influence.

If any person should, unintentionally, be led to strike a fish, which has just escaped from another, I conceive he is justified in retaining it, the meanness of the act not consisting in the transaction itself, but in the design to seize upon a fish, in point of equity the right of another. But any one who is the original striker of a whale, must, undoubtedly, condemn him who *designedly* interferes, and must esteem the act of intentionally anticipating his boats, as little better than a robbery.

From the second law, a fish may alternately become the property of several persons, each of whose claim immediately ceases, the moment he loses possession.

The crew of the Mars of Whitby, commanded by my Father, killed a whale at the commencement of a storm in the beginning of May 1817. It was taken to the ship and secured by a new *nine-inch* hawser; but such was the violence of the sea, that when the ship was on the point of rounding a promontory of ice, which was capable of affording excellent shelter from the sea, the hawser broke. When the gale abated, my Father proceeded in search of his fish, found it, and got up to it, a few minutes after the people of another vessel had seized it. His claim was, therefore, at an end with regard to the fish, and even the part of the hawser which was fast to it, was exultingly refused him. But the triumph of the new possessors was short; the swell drove their ship against the ice, and they were obliged to cast the fish adrift. A third ship then found it, and succeeded in making prize of it.

If, when a person, from friendly motives, sends his boats to assist those of another ship in the capture of a fish, it should happen that the fish slips loose, and his boats succeed in first re-striking it, the whale in this case, according to the Greenland law, is the prize of the last striker, because it was loose: but according to principles of right and strict honour, I conceive it is the property of the first striker, and as such, ought to be given up. Three reasons occur to me for enforcing such a doctrine: 1*st*, The

consideration, that the auxiliary ship would not, probably, have become the possessor of this fish, had it not been previously struck by the other: *2dly*, That as the boats were sent out with the view to assist the then possessors in the capture, they ought to fulfil the object for which they embarked in the cause, and not convert it into a plea for taking the fish to themselves; and, *3dly*, The golden precept, already mentioned, "Whatsoever ye would that men should do to you, do ye even so to them."

From what has been now advanced, it will probably appear to be a matter of doubt, whether or not, on the whole, any alteration in the Greenland fishing laws would be beneficial to the trade. Uncertain, however, as this point is, there can be no doubt, but that the speculators in the fishery in general, as well as the underwriters of their ships, would be materially benefited by some amendment in the custom relative to the stores and cargoes saved from wrecked vessels.

At present, the fishing laws are extended to the case of wrecks, which, together with their cargoes and stores, are considered, equally with a loose fish, as free prizes. This extension of the fishing laws is frequently acted on: stores are saved from wrecks and appropriated entirely to the use of the savers, and no account of them whatever, rendered to the original owners. But although this applica-

tion of the law has been repeatedly admitted, I am not aware that it has been legally established. In support of this principle, however, the fishers contend, that the existing laws are well adapted to the nature of the trade, and that their application, whether to fish, or to the stores and cargoes of wrecks, is universal; that the British laws, relative to salvage, and the claim of the original owners on abandoned or lost property, is foreign to matters of this nature; and, consequently, that in a court of law, the case must be adjudged by the custom established in the fishing seas, where the transaction took place, and not by the laws of the country where the case is tried.

The propriety of appropriating all wrecked stores to the use of the savers, is argued from the supposition, that few persons would consider the benefit of the usual salvage, (supposing it never to exceed a third), as a sufficient remuneration for encumbering themselves with the stores of wrecks; and much less would the same reward induce any one to save the cargo of a wrecked ship, because by so doing, they would burden themselves with the property of others, of which they must be obliged to render an account, when subsequently it might appear, that had not the room in the ship been thus occupied, they might have procured a full cargo of blubber of their own taking, on which no one could have any claim; and consequently the owners of the

vessel saving the stores would suffer a loss equal to the value restored to the owners of the wreck.

Now, if it were really the case, that a small salvage only could be legally claimed by the savers of wrecked stores, which would have the effect of preventing any stores whatever from being saved, it would be an impolitic law, because the leaving of goods in Greenland is absolutely a national loss; but if, on the other hand, it should appear that, by the enacting of an express law offering a larger salvage than is usual, the preceding objections would be obviated, and the quantity of stores saved from wrecks increased,—then would it become an object worthy of legislative interference, especially if to a national advantage should be added that of an equitable arrangement in the distribution of property. Supposing, for instance, the salvage established by law were to be one-half on all fishing-stores, and other materials belonging to wrecks, but two-thirds, or even three-fourths, on the cargoes of wrecks, it might answer the desired end. It would, at any rate, obviate an existing fear of controversy, which induces some owners to give positive orders to their captains, to take no wrecked stores on board. Substituting the above salvage, then, instead of a regular one-third, or even less, I conceive the abstract of Dutch laws already before the reader, would, on the whole, be admirably adapted to the present circumstances of the fishery. Articles 10. and 11.

might be omitted as unnecessary at the present day, and likewise the first clause of the 1st article; for the principle of humanity is happily not so far extinct that any British seaman should need a legal order to induce him to save, protect and nourish a fellow-creature in distress!

The following circumstance, which occurred a good many years ago, has a tendency to illustrate the existing Greenland laws, and to set them in a prominent light.

During a storm of wind and snow, several ships were beating to windward, under easy sail, along the edge of a pack. When the storm abated, and the weather cleared, the ships steered towards the ice. Two of the fleet approached it, about a mile asunder, abreast of each other, when the crews of each ship accidentally got sight of a dead fish, at a little distance within some loose ice. Each ship now made sail, to endeavour to reach the fish before the other; which fish being loose, would be a prize to the first who should get possession of it. Neither ship could outsail the other, but each continued to press forward towards the prize. The little advantage one of them had in distance, the other compensated with velocity. On each bow of the two ships, was stationed a principal officer, armed with a harpoon, in readiness to discharge. But it so happened, that the ships came in contact with each other, when within a few yards of the fish, and in consequence

of the shock with which their bows met, they rebounded to a considerable distance. The officers, at the same moment, discharged their harpoons, but all of them fell short of the fish. A hardy fellow, who was second mate of the leeward ship, immediately leaped overboard, and with great dexterity swam to the whale, seized it by the fin, and proclaimed it his prize. It was, however, so swoln, that he was unable to climb upon it, but was obliged to remain shivering in the water until assistance should be sent. His captain, elated with his good luck, forgot, or at least neglected, his brave second mate; and before he thought of sending a boat to release him from his disagreeable situation, prepared to moor his ship to an adjoining piece of ice. Meanwhile, the other ship tacked, and the master himself stepped into a boat, pushed off, and rowed deliberately towards the dead fish. Observing the trembling seaman still in the water, holding by the fin, he addressed him with, "Well, my lad, you've got a fine fish here,"—to which, after a natural reply in the affirmative, he added, "But don't you find it very cold?"—"Yes," replied the shivering sailor, "I'm almost starved; I wish you would allow me to come into your boat until *ours* arrive." This favour needed no second solicitation, the boat approached the man, and he was assisted into it. The fish being again loose and out of possession, the captain instantly struck his

harpoon into it, hoisted his flag, and claimed his prize! Mortified and displeased as the other master felt at this trick, for so it certainly was, he had, nevertheless, no redress, but was obliged to permit the fish to be taken on board of his competitor's ship, and to content himself with abusing the second mate for his want of discretion, and with condemning himself for not having more compassion on the poor fellow's feelings, which would have prevented the disagreeable misadventure.

As in some measure connected with the laws of the whale-fishery, I might also mention the signals used by the fishers; but as they are of interest to few persons excepting such as are concerned in the fishery, they are placed in the Appendix *.

SECT. XIV.

Remarks on the Causes on which Success in the Whale-Fishery depends.

SUCCESS in the whale-fishery has been very generally supposed to depend, not upon the exercise of talent and industry on the part of the masters and

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* Appendix, No. VI.

crews of the fishing ships, but solely upon the freaks of fortune.

That there is something resembling what is called *chance* or *luck* in the fishery, cannot be disputed; but that the fishery is altogether a chain of casualties, is as false as it is derogatory to the credit of the persons employed in the enterprize. For a person with a die to throw the highest point once in six times, is what might be expected from *chance;* but for him to throw the highest point many times in succession, would afford a presumptive proof that he employed some art in casting the die; so it is with the fishery. The most skilful, from adventitious and unavoidable circumstances, may occasionally fail, and the unskilful may be successful; but if we mark the average of a number of years, that is, where the means are equal, a tolerable estimate may be formed of the adventurer's ability, and his fitness for the undertaking in which he is engaged.

The great variety of success which is observed to result from the exertions of the different Greenland commanders, when the average of several voyages is taken, confirms the above position; and the circumstance of some masters, in whatever ship they may sail, almost always succeeding, whilst others, however favourably circumstanced, seldom or never procure a full cargo, warrants this conclusion,—that, most generally, a successful fishery depends on the experience, determined perseverance, and per-

sonal talent of the master of the vessel, supported by a necessary degree of skill among the people composing his crew. There are occasions, however, especially in those seasons when the Greenland seas are open, or in some measure free from ice, in which personal talent becomes of comparative little avail. This was strikingly the case in the year 1817, and in some degree in 1818. In the former season, in particular, the ice lay at a distance so remote from Spitzbergen, that a space of about 2000 square leagues of the surface of the sea, which is usually covered by ice, was wholly void of it. Hence the whales, having an immense sea to sport in, and finding no ice in the usual places to act as an obstacle to prevent their flight, or as a shelter to induce their stay, were either constantly moving from place to place, or took up their abode in the most unfrequented and unexpected situations. Whatever judgments, therefore, were formed, though founded on the most plausible appearances, or whatever probabilities the judicious fisher was led by experience to estimate and act upon, proved fallacious, and tended only to embarrass him in all his proceedings. Thus inferences and deductions the most sagacious in appearance, had no tendency but to mislead and perplex the navigator. Besides, the range of space in the fishing country being so astonishingly great, and the whales, except in a few particular spots, so unusually scarce, it followed, that the fishery, as was actually the case, must be ex-

tremely partial: For, whenever a ship happened to cruise in a direction where no fish were found, much time was expended before she could either return, or visit some other remote situation, considered as a probable retreat of the whales; and meanwhile, perhaps, a successful fishery was made in the very spot she had left.

The only general indication, in the season of 1817, which could be of the least service to the fisher, to assist him in the choice of a situation, was the colour of the sea. In places where the water was transparent and blue, or greenish blue, it was in vain to look for whales; but, in a certain stream of cloudy water of a deep olive green colour, which extended, with some interruptions, from the latitude of 80° N. in the parallel of 2° or 3° E. to the latitude of 74° in the parallel of 5° to 10° W., all the whales which were seen throughout the season, or at least nine-tenths of them, occurred; and the chief part of those which were caught, were found in the same stream of water. This kind of sea-water, respecting which I have had occasion to speak in the first volume of this work, occurs to a remarkable extent in the Greenland seas. It is the favourite resort of whales during the fishing season; evidently because it abounds with various descriptions of actiniæ, sepiæ, medusæ, and cancri, which constitute the chief, if not the sole nourishment of the whale. Such whales as were seen in the clear blue-coloured sea-water, were never ob-

served to be at rest, but invariably in motion, as if they were in the act of performing a journey to some other place. In the cloudy green sea, on the other hand, they were observed to halt, and generally made it their home, as it were, during a period of several days or weeks. At length, early in the month of July, they totally disappeared from the green-coloured sea likewise, and retreated to some other situation, unknown to the fishers, to which, though the ice was generally open and navigable at the time, it was found to be almost impossible to trace them. The general conduct of whales, after being struck, was in this season peculiar. Instead of immediately descending to the depth of near a mile, they frequently never went down at all; and those which did descend, after receiving the harpoon, seldom proceeded more than 200 to 300 yards below the surface. The year referred to, (1817,) was what the fishers call an *open* season, to distinguish that state of the country, when the ice lies remote from Spitzbergen, from the *close* season, when the country is nearly full of ice.

The fishery of open seasons is more uncertain than that of close seasons. In the former, the fisher has but little dependance on any certain place for affording whales; but, in the latter, whenever the barrier of ice is passed, he has the fullest confidence of meeting with them, near the borders of

the western ice, between the parallels of 78° and 79° of latitude.

Success in the fishery has some dependance on the suitable equipment of the ships employed in the trade,—on a sufficient apparatus,—and frequently, in no inconsiderable degree, on that valuable property of a ship, called fast-sailing. When any opening occurs in the ice, of a tempting appearance, it frequently happens that a number of ships enter it together. The fastest *sailers* lead the way, and often procure a whale or two, or more, before the heavy-sailing ships can perform the navigation; and, by the time the latter accomplish it, the "run of fish" is frequently over.

When the ice lies so far to the eastward, that it covers the green-coloured water, usually resorted to, during the fishing season, by the whales, it is advisable to persevere in the fishery in icy situations; but when the green-coloured sea is uncovered by the ice, it is generally more advantageous to fish in the open sea.

Too great anxiety on the part of the commanders, is sometimes the occasion of failures in the fishery. When such is the case, they are apt to be dissatisfied with the situation they occupy, though whales may be occasionally seen in it, and though they may, now and then, present them with an opportunity of making a capture. Hence the too anxious fisherman not unfrequently leaves the place

where whales were seen, and proceeds to a distant quarter, where he cannot meet with whales at all.

Not a little depends, in the fishery, on the confidence the sailors have in the skill of their captain, and in the efficiency of the personal talents and exertions of their officers. If the officers are frequently unfortunate, they are apt to lose confidence in them, and proceed, even when good opportunities occur, without spirit to the attack. The greater their spirits and confidence, the better is the chance they have of success. Hence the crew of a ship which has met with success, can generally fish better, and more advantageously, under the same circumstances, than the people of a clean ship. Men, discouraged by the failure of their exertions, lose their spirits, and, with them, their activity. Their judgments even are clouded by the depression of their minds, so that they become inferior, in every respect, to successful fishers, of the same natural talent. Hence it is of great importance, that the ardour and confidence of the crew of a whaler should be encouraged and stimulated: for, on their exertions, when plenty of whales are in view, success almost entirely depends. But for the regulation of the ship's movements,—for the choice of a situation,—for direction in difficulties,—for a stimulus when discouraged,—for encouragement when weary,—and for a variety of other important matters, the master alone must

be looked to, on whom, indeed, almost every considerable effort of judgment or forethought devolves.

When a sudden impulse,—when uncommon exertion,—or when long-continued labour is required, the judicious distribution of spiritous liquors among the crew, is sometimes of essential benefit; but as, on the one hand, spiritous liquor stimulates by its direct influence; so, on the other hand, it produces a corresponding depression, by its re-action, so that its use, under ordinary circumstances, is perhaps injurious, rather than the contrary.

SECT. XV.

Anecdotes Illustrative of the Dangers of the Whale-Fishery.

It is evident that the capture of so large an animal as a whale, possessing strength in proportion to its bulk, with an uncommon degree of activity for its size, and inhabiting an element in which its invaders cannot exist, must always be accompanied with danger to the fishers. Though fatal accidents do not so frequently occur, as a general view of the bold and hazardous operations connected with the capture of whales would lead us to expect; yet the fishers frequently encounter imminent risks, and occasionally lose their lives in the enterprise.

As the subject is generally interesting, I shall give a few instances of accidents and remarkable occurrences, illustrative of the dangers of the whale-fishery, most of which occurred within the sphere of my own observation.

Those employed in the occupation of killing whales, are, when actually engaged, exposed to danger from three sources, viz. from the ice, from the climate, and from the whales themselves.

Of these three principal sources of accidents, each of which will be illustrated in order, it may be observed generally, That casualties from the ice are neither so common, nor so fatal, as those arising from the whale, or from the climate; that the climate is the source of the most fatal disasters, but happily not the most frequent; and that the whale itself, though generally undesignedly, is the source of a great proportion of the accidents which occur.

I. The ice is a source of danger to the fishers, from overhanging masses falling upon them,—from the approximation of large sheets of ice to each other, which are apt to crush or upset the boats,—from their boats being stove and sunk by large masses of ice, agitated by a swell,—and from the boats being enclosed and beset in a pack of ice, and their crews thus prevented from joining their ships.

Dangers from Overhanging Masses of Ice falling on the Boats.—The crew of one of the Hull whalers having, a few years ago, killed a fish by the side of an ice-berg, in Davis' Straits, the fins were lashed together, and the tail secured to a boat, in the usual way, but by the efforts only of one boat's crew; all the other boats belonging to the same ship, being engaged in the capture of two more whales, neither of which were yet subdued. This circumstance occasioned some altercation among the crew of the boat, as to the propriety of their remaining by the dead whale, or of quitting it, and proceeding in an empty boat, which was at hand, to the assistance of their companions. The latter measure was carried; but as it was deemed expedient that one man should remain in the boat, to which none of them would consent, they were under the necessity of either remaining in idleness by the fish, or leaving the fish and boat by themselves. But every one being anxious to participate in the more active exercises of the fishery, they at length agreed unanimously to quit the boat connected with the dead fish, and to proceed to the aid of their comrades. The arrangements were just accomplished in time; for they had not rowed many fathoms from the place, before a tremendous crash of the *berg* ensued,—an immense mass of ice fell upon the boat they had just quitted, and neither it nor the fish were ever seen afterwards.

Two harpooners who sailed with me, to the fishery in the year 1814, were engaged, at a former period, in the capture of a whale at Davis' Straits, in the service of the ship James, when the boat from which the fish was struck, was dragged by the line under an overhanging precipice of a huge ice-berg. It remained some time stationary, and then was again withdrawn to a small distance, when a mass immediately fell from the summit, which, had they remained in their original position, must have crushed the boat to pieces, and buried the crew in the deep. Their escape was indeed so happy and so striking, that they did not scruple to designate it as providential; and the danger was yet so near, that the waves produced by the concussion of the ice on the water, passed, in considerable *sprays*, over the boat.

Dangers arising from Ice, when Boats are enclosed and beset, and their Crews thus prevented from joining their Ships. — June 17th 1813, several Greenland fishing ships penetrated the ice into an enticing opening, in which a number of whales were sporting in fancied security. The John, of Greenock, Neptune, of Aberdeen, and Earl Percy, of Kirkcaldy, were immediately, to appearance, successful. The crew of the John, in a short time, killed several fish; the people of the Neptune killed one, and struck a second; and the crew of the

Earl Percy struck one also. Things were in this state, when I arrived in the same situation, with the Esk. My harpooners, happily as it proved, did not succeed in any measure. The sea was as smooth as the surface of a pond; but the ice, I observed, was in a strange state of disturbance. Some floes, and some large pieces, moved with a velocity of three or four miles *per* hour, while other similar masses were at rest. Some sheets of ice, though quite detached from the main body, moved towards the south, as it were by magic, and with such a degree of rapidity, that they left traces in the water over which they passed, resembling the eddies produced by a strong current in a shallow river. The John, which, on her first arrival in this situation, had navigated an open lake some leagues in circumference, was, in the space of a few hours, closely beset. The captain of the Neptune, alarmed by the danger to which his men and boats were exposed, left his ship to the care of his second mate, with 11 or 12 men, and proceeded himself in a boat, making the fifth, to their assistance. In a few minutes, these five boats, together with two belonging to the Earl Percy, were closely fixed in the ice. The ships, meanwhile, were progressively forced to a distance, by the quantity of ice which poured in from the north, and interposed itself between them and the boats. In the course of the following morning, the intervening ice had spread to the width of seven or

eight miles; and shortly afterwards, the people in the boats, and those in the corresponding ships, lost sight of each other. Happily for the men who were in these boats, the John was near; and so long as she remained in safety, their lives were not exposed to immediate danger. My Father, who at this time commanded the John, had anticipated the consequences of the ice closing, and sought out a place of refuge. This consisted of a cove in an adjoining field, filled with bay-ice, into which he thrust his ship, and obtained the desired shelter. After three days, the ice slacked, and the Neptune's boats, together with those belonging to the Earl Percy, left the John, although neither the sea nor their ships were visible. In this adventure they proved successful. When they had rowed many hours to the south-eastward, they discovered a ship, on their approach to which they were invited on board, and received some refreshment. After this, having received information of the relative situation of their ships, they put off, and soon afterwards had the happiness of regaining their respective vessels. This circumstance, which was the occasion of so much anxiety, danger, and loss of time to the crews of the Neptune and Earl Percy, proved the contrary to the people of the John, as they added to her cargo seventeen whales, within the space of five days; and, on the sixth, the ice having again slacked, they made their escape into a place of safety.

Under this head, I could adduce a great number of anecdotes; but as they possess a considerable degree of sameness, the preceding may suffice.

II. The climate of the Polar regions becomes a source of danger to the whale-fishers, when boats are separated from the ship to which they belong, in foggy weather,—when they are overtaken by a storm, and prevented from joining their ship,—and when the people in the boats are long exposed to inclement winds.

Boats separated from their Ship in Thick Weather.—During a calm foggy season, towards the latter end of June, about the year 1800, a harpooner belonging to the Hercules whaler, struck a fish, which, taking but a small quantity of line from the fast-boat, ran off along the surface of the water with astonishing velocity. Three boats belonging to the same ship had just time to join company with the fast-boat, to which they were secured by means of a rope, and towed without danger of disunion. In a short time they were effectually separated from their ship. The fish dragged them 30 or 40 miles in a southerly direction, without their being able to overpower it. After passing many hours in a state of increasing anxiety of mind, benumbed with cold and oppressed with hunger, they at length heard

some sound as if proceeding from a ship. They raised a loud huzza, which fixed the attention of the watch in the ship, and in a few minutes they had the happiness of forming a junction with the Henrietta. At their request, assistance was instantly afforded them, with which the whale, that they had so long pursued in vain, was presently killed. They were then received on board of the Henrietta, got permission to place their fish alongside, and were refreshed with an ample supply of food and drink, and then retired to rest. They remained 48 hours on board of this ship, during which time the weather was constantly calm and foggy. When the weather cleared, they observed a hummock of ice in the horizon, which, mistaking for a ship, they put off towards it with their fish in tow. They were provided with a compass, for assisting them in the navigation, and received the promise of Captain Kearsley, that he would remain with his ship, the Henrietta, in the same position for a few hours, that they might return to him, provided they were unable to find their own ship. The fog recommenced, and after six hours absence, the boats with the fish returned. As a breeze of wind now sprung up, in a direction fair for England, the Henrietta, which was nearly full, prepared to take advantage of it. The people of the Hercules were therefore obliged to depart. They put off again to traverse the sea; but as the Henrietta receded to a distance, their

courage failed them. Rather than again brave the terrors which they had but recently escaped, they determined to sacrifice the whale. They accordingly returned to the ship they had left, cast their fish adrift, which, being picked up by the Henrietta's crew, was added to her cargo, and, agreeable to the usage of the fishery, became her prize. The condition was, that the Hercules's men should, if practicable, be put on board of their own vessel.

The fish being flensed, the Henrietta stretched to the northward about 30 miles, and fell in with a ship, which proved to be the Dundee, commanded by my Father. From him they received information of the situation of the Hercules, and proceeded according to his directions, firing guns at intervals, as the fog had returned, until at length they were rejoiced by the sound of a gun in answer. By repeating their signals, they soon afterwards joined the ship of which they were in search, and the men and boats were restored to the Hercules; but the fish, according to agreement and general usage, was detained.

*Boats overtaken by Storms, and prevented from joining their Ships**.—On the commencement

* Though the circumstance immediately following has no reference to the fishery, excepting in so far as the circumstance occurred in Greenland, it is inserted here, on account of the interest connected with the adventure.

of a heavy gale of wind, May 11. 1813, fourteen men put off in a boat from the Volunteer of Whitby, with the view of setting an anchor in a large piece of ice, to which it was their intention of mooring the ship *. The ship approached on a signal being made, the sails were clewed up, and a rope fixed to the anchor; but the ice shivering with the violence of the strain when the ship fell astern, the anchor flew out, and the ship went adrift. The sails being again set, the ship was reached to the eastward (wind at north), the distance of about two miles; but in attempting to wear and return, the ship, instead of performing the evolution, scudded a considerable distance to leeward, and was then reached out to sea; thus leaving fourteen of her crew to a fate the most dreadful, the fulfilment of which seemed almost inevitable. The temperature of the air was 15° or 16° of Fahr. when these poor wretches were left upon a detached piece of ice, of no considerable magnitude, without food, without shelter from the inclement storm, and deprived of every means of refuge except in a single boat, which, on account of the number of men, and violence of the storm, was incapable of conveying them to their ship. Death stared them in the face whichever way they turned,

* The "ice-anchor" is represented by fig. 2, and 3. Pl. 21. and the "ice-axe," with which the hole is made, by fig. 1. Sometimes an "ice-drill" fig. 4. Pl. 19. is made use of for this purpose.

and a division in opinion ensued. Some were wishful to remain by the ice, but the ice could afford them no shelter from the piercing wind, and would probably be soon broken to pieces by the increasing swell; others were anxious to attempt to join their ship while she was yet in sight, but the force of the wind, the violence of the sea, the smallness of the boat in comparison of the number of men to be conveyed, were objections which would have appeared utterly insurmountable to any persons but men in a state of despair. Judging that, by remaining on the ice, death was but retarded for a few hours, as the extreme cold must eventually benumb their faculties, and invite a sleep which would overcome the remains of animation,—they determined on making the attempt of rowing to their ship. Poor souls, what must have been their sensations at this moment,—when the spark of hope yet remaining was so feeble, that a premature death even to themselves seemed inevitable. They made the daring experiment, when a few minutes trial convinced them that the attempt was utterly impracticable. They then, with longing eyes, turned their efforts towards recovering the ice they had left, but their utmost exertions were unavailing. Every one now viewed his situation as desperate; and anticipated, as certain, the fatal event which was to put a period to his life. How great must have

been their delight, and how overpowering their sensations, when at this most critical juncture a ship appeared in sight! She was advancing directly towards them; their voices were extended, and their flag displayed. But although it was impossible they should be heard, it was not impossible they should be seen. Their flag was descried by the people on board the ship, their mutual courses were so directed as to form the speediest union, and in a few minutes they found themselves on the deck of the Lively of Whitby, under circumstances of safety! They received from their townsmen the warmest congratulations; and while each individual was forward in contributing his assistance towards the restoration of their benumbed bodies, each appeared sensible that their narrow escape from death was highly providential. The forbearance of GOD is wonderful. Perhaps these very men, a few hours before, were impiously invoking their own destruction, or venting imprecations upon their fellow-beings! True it is, that the goodness of the Almighty extendeth over all his works, and that while "Mercy is his darling attribute,"—"Judgment is his strange work."

The Resolution of Whitby was moored to a flat piece of ice, surrounded by streams and open drift-ice, on the 30th of April 1808. In the evening, a whale was harpooned, which took about the length of a

mile and a half of line from the fast-boat. Three other harpoons and several lances were then struck. A convulsive effort of the whale followed, when, to the astonishment of every one, it was found to be free. It dived and escaped. By a single energetic throe, one of the lines and one of the harpoons, were broken, and two other harpoons were drawn out. In the interval of time, in which the boats had been engaged, a storm commenced; the loss of the fish was therefore considered as a happy release. The crews of five boats were left to *haul* the lines in, and two (myself in one) returned to the ship. Thick snow immediately began to fall, the boats were already out of sight, and their distance was constantly increasing on account of the rapid drift of the ship to leeward. At 1 A. M. the mooring was cut, the sails set, and the ship worked on short tacks to windward, in the supposed direction of the boats. At 3 A. M. we were rejoiced by the sight of three of the boats; the crews of which informed us, that the remaining two might be expected in half an hour by the same track. During five tedious hours of anxiety and distress, we navigated off and on among troublesome and dangerous ice. Guns were fired occasionally, and at every interval all hands were occupied in straining their eyes, with the hope of descrying the boats through the obscurity of the snow. The snow was not attenuated, the storm raged, and the sea increased, while a

sympathetic gloom appeared in every countenance, which progressively darkened and kept pace with the dismalness of the night. The loss of one-half of the Ipswich's crew, on a similar occasion, was yet fresh on our minds, and involuntary shudderings indicated our dread of a similar fate to our comrades. At length, happy moment, a little after 8 A. M. a shout of joy announced the approach of the boats, and a few minutes afterwards their crews received the most heartfelt greeting from their shipmates. Being much affected with long exposure to cold, they were not suffered to approach a fire, until by an exertion as violent as they were capable of, in chasing each other round the decks, they had excited a genial glow of heat in their bodies, and fitted themselves for the change of temperature. A stout Shetland boy was very near falling a sacrifice to the severity of the exposure. He expressed a great wish for sleep, and earnestly entreated the men to allow him to compose himself for half an hour; which indulgence he procured in part, by declaring with confidence that he should dream of the situation of the ship. After a few minutes repose, he was awoke with difficulty, and it required constant attention on the part of his companions to preserve him from a sleep, which they well knew was, under such circumstances, the harbinger of death.

One of the most calamitous events which, in modern times, has occurred in the fishery, was that above alluded to, which happened to the crew of the Ipswich, Captain Gordon, about fifteen years ago. A whale was struck and killed by the Ipswich's people, early in the spring of the year; a season in which the weather is most uncertain. A storm commenced, accompanied with snow, before the capture was completed, but nevertheless the fish was taken to the ship, and having shelter from the ice, it was flensed. Meanwhile four boats' crews were employed on a piece of ice, in hauling in the lines of the fast-boats, &c.; during the performance of which duties, the ship drifted out of sight of them. Every effort was then made by the captain, for discovering these unhappy men, who, being above twenty in number, constituted nearly half of his crew. But the weather continuing thick and stormy, and the frost most intense, it is probable they all perished before the conclusion of the gale; at least none of them were saved, nor can I learn that any of their bodies were ever found *.

The remarkable property of oil in smoothening the surface of the sea when considerably agitated,

* The particulars of this unhappy affair I was desirous to have given at some length; but though I applied to those capable of affording the information, I have not yet been favoured with any reply.

and of preventing breakers in the main ocean, was sometimes resorted to by the ancient whale-fishers for their preservation when overtaken by storms at sea. It was not unusual, I believe, a century ago, for every whale-boat to carry along with it a keg of oil, for this very purpose; which oil being slowly poured overboard in a storm, afforded a sort of defence to the boat as it drifted to leeward. The height of the waves, it is true, is not affected by the action of the oil, but as it intercepts the attraction which dry air possesses for water, it prevents the immediate action of the wind, quells the ruffled surface of the waves, and in a great degree prevents the tendency to breakers, which constitutes the principal danger in a storm.

Danger of long Exposure to inclement Winds.—The whale-fishers being well defended against the cold by suitable clothing, seldom suffer much from it. Many instances, indeed, occur, in which the sailors have their faces, feet or hands, partially frozen, and a few instances where the seeds of disorders are sown, which sometimes occasion premature death; but, on the whole, calamitous circumstances of this nature do not often happen. I have witnessed several instances of the pernicious effects of severe cold, but nothing so remarkable as to be worthy of communication. " Those events resulting from shipwrecks in the Polar regions, have

produced the most distressful consequences; but they do not come under this division of my work.

III. The most extensive source of danger to the whale-fisher, when actively engaged in his occupation, arises from the object of his pursuit.

Excepting when it has young under its protection, the whale generally exhibits remarkable timidity of character. A bird perching on its back alarms it; hence, the greater part of the accidents which happen in the course of its capture, must be attributed to adventitious circumstances on the part of the whale, or to mismanagement or fool-hardiness on the part of the fishers.

In this employment, the fisher is liable to receive contusions from oars forcibly struck by the fish, or from direct blows from its fins or tail;—he is liable to accidents, from getting entangled by the lines, or from the boat being drawn under water by the fish, through the medium of the lines;—and he is in danger of being thrown overboard by the heeling or jerking of the boat, or more particularly from the boat being stove, upset, sunk, or projected into the air, by the force of a blow from the whale.

Contusions from Blows by the Whale.—Several instances have occurred, in which serious accidents have been occasioned by blows from the whale either directly struck, or impressed through the medium of oars. Harpooners have been struck dead

by a single blow of a whale's tail, and other fishers have received dangerous wounds. But as I am not in possession of so many of the particulars of these circumstances as to be able to give them in the narrative form, this description of accidents must pass without any particular illustration.

Injuries sustained by Entanglements of the Lines.—One of the crew of the John of Greenock, who was in a fast-boat, in the fishery of 1818, unfortunately slipped his foot through a coil of line in the act of running out, which drew him forward to the boat's stem, and separated his foot by the ancle. He was conveyed by the first boat to the ship, where the assistance of several surgeons being procured, the lower part of the leg was cut off. After this, the poor fellow having received the most unremitting attention from Captain Jackson, with the best sustenance and accommodation the ship could afford, was restored to health, and his wound in a great measure healed, before the conclusion of the voyage. It is worthy of being remarked, that the captain and crew of the John subscribed upwards of 24 *l.* for his relief, which was increased by the owners of the ship, and others, on arrival, to about 37 *l.* This sum was placed in the "Provident Bank," at Greenock, from whence he was permitted to draw it, after the rate of 7 *s.* *per* week.

A harpooner belonging to the Henrietta of Whitby, when engaged in lancing a whale, into which

he had previously struck a harpoon, incautiously cast a little line under his feet that he had just hauled into his boat, after it had been drawn out by the fish. A painful stroke of his lance induced the whale to dart suddenly downward, his line began to run out from beneath his feet, and in an instant caught him by a turn round his body. He had but just time to cry out, "Clear away the line,"—"O dear!" when he was almost cut asunder, dragged overboard, and never seen afterwards. The line was cut at the moment, but without avail. The fish descended a considerable depth, and died; from whence it was drawn to the surface by the lines connected with it, and secured.

Fishers thrown Overboard, by the jerking or sudden heeling of the Boats, in consequence of Blows from Whales.—On the 3d of June 1811, a boat from the ship Resolution, commanded at the time by myself, put off in pursuit of a whale, and was rowed upon its back. At the moment that it was harpooned, it struck the side of the boat a violent blow with its tail, the shock of which threw the boat-steerer to some distance into the water. A repetition of the blow projected the harpooner and line-manager in a similar way, and completely drenched the part of the crew remaining in the boat, with the sprays. One of the men regained the boat, but as the fish immediately sunk, and drew

the boat away from the place, his two companions in misfortune were soon left far beyond the reach of assistance. The harpooner, though a practised swimmer, felt himself so bruised and enervated by a blow he had received on the chest, that he was totally incapacitated from giving the least support to his fellow sufferer. The ship being happily near, a boat which had been lowered on the first alarm, arrived to their succour, at the moment when the line-manager, who was unacquainted with the art of swimming, was on the point of sinking, to rise no more. Both the line-manager and harpooner were preserved; and the fish, after a few hours close pursuit, was subdued.

A large whale, harpooned from a boat belonging to the same ship, became the subject of a general chase on the 23d of June 1809. Being myself in the first boat which approached the fish, I struck my harpoon at arm's length, by which we fortunately evaded a blow that appeared to be aimed at the boat. Another boat then advanced, and another harpoon was struck, but not with the same result; for the stroke was immediately returned by a tremendous blow from the fish's tail. The boat was sunk by the shock; and, at the same time, whirled round with such velocity, that the boat-steerer was precipitated into the water, on the side next to the fish, and was accidentally carried down to a considerable depth by its tail. After a minute or so, he

arose to the surface of the water and was taken up, along with his companions into my boat. A similar attack was made on the next boat which came up; but the harpooner being warned of the prior conduct of the fish, used such precautions, that the blow, though equal in strength, took effect only in an inferior degree. The boat was slightly stove. The activity and skill of the lancers soon overcame this designing whale, accomplished its capture, and added its produce to the cargo of the ship. Such intentional mischief on the part of a whale, it must be observed, is an occurrence which is somewhat rare.

Again. "While the same ship, (Resolution,) navigated an open lake of water, in the 81st degree of north latitude, during a keen frost and strong north wind, on the 2d of June 1806, a whale appeared, and a boat put off in pursuit. On its second visit to the surface of the sea, it was harpooned. A convulsive heave of the tail, which succeeded the wound, struck the boat at the stern; and by its reaction, projected the boat-steerer overboard. As the line in a moment dragged the boat beyond his reach, the crew threw some of their oars towards him for his support, one of which he fortunately seized. The ship and boats being at a considerable distance, and the fast-boat being rapidly drawn away from him, the harpooner cut the line, with the view of rescuing him from his dangerous situation. But no sooner was this act performed, than

to their extreme mortification they discovered, that in consequence of some oars being thrown towards their floating comrade, and others being broken or unshipped by the blow from the fish, one oar only remained; with which, owing to the force of the wind, they tried in vain to approach him. A considerable period elapsed, before any boat from the ship could afford him assistance, though the men strained every nerve for the purpose. At length, when they reached him, he was found with his arms stretched over an oar, almost deprived of sensation. On his arrival at the ship, he was in a deplorable condition. His clothes were frozen like mail, and his hair constituted a helmet of ice. He was immediately conveyed into the cabin, his clothes taken off, his limbs and body dried and well rubbed, and a cordial administered to him which he drank. A dry shirt and stockings were then put upon him, and he was laid in the captain's bed. After a few hours sleep he awoke, and appeared considerably restored, but complained of a painful sensation of cold. He was, therefore, removed to his own *birth*, and one of his messmates ordered to lie on each side of him, whereby the diminished circulation of the blood was accelerated, and the animal heat restored. The shock on his constitution, however, was greater than was anticipated. He recovered in the course of a few days, so as to be able to engage in his ordinary pursuits; but many

months elapsed, before his countenance exhibited its wonted appearance of health.

Boats Sunk, Stove, or Upset, by blows from Whales.—The Aimwell of Whitby, while cruising the Greenland seas, in the year 1810, had boats in chase of whales on the 26th of May. One of them was harpooned. But instead of sinking immediately on receiving the wound, as is the most usual manner of the whale, this individual only dived for a moment, and then rose again beneath the boat, struck it in the most vicious manner with its fins and tail, stove it, upset it, and then disappeared. The crew, seven in number, got on the bottom of the boat; but the unequal action of the lines, which for some time remained entangled with the boat, rolled it occasionally over, and thus plunged the crew repeatedly into the water. Four of them, after each immersion, recovered themselves and clung to the boat; but the other three, one of whom was the only person acquainted with the art of swimming, were drowned before assistance could arrive. The four men on the boat being rescued and conveyed to the ship, the attack on the whale was continued, and two more harpoons struck. But the whale irritated, instead of being enervated by its wounds, recommenced its furious conduct. The sea was in a foam. Its tail and fins were in awful play; and in a short

time, harpoon after harpoon drew out, the fish was loosened from its entanglements and escaped.

In the fishery of 1812, the Henrietta of Whitby suffered a similar loss. A fish which was struck very near the ship, by a blow of its tail, stove a small hole in the boat's bow. Every individual shrinking from the side on which the blow was impressed, aided the influence of the stroke, and upset the boat. They all clung to it while it was bottom up; but the line having got entangled among the thwarts, suddenly drew the boat under water, and with it part of the crew. Excessive anxiety among the people in the ship, occasioned delay in sending assistance; so that when the first boat arrived at the spot, two survivors only out of six men were found.

During a fresh gale of wind in the season of 1809, one of the Resolution's harpooners struck a sucking whale. Its mother being near, all the other boats were disposed around, with the hope of entangling it. The old whale pursued a circular route round its cub, and was followed by the boats; but its velocity was so considerable, that they were unable to keep pace with it. Being in the capacity of harpooner on this occasion myself, I proceeded to the chase, after having carefully marked the proceedings of the fish. I selected a situation, in which I conceived the whale would make its appearance, and was in the act of directing my crew to cease rowing, when a terrible blow was struck on the boat. The

whale I never saw, but the effect of the blow was too important to be overlooked. About 15 square feet of the bottom of the boat were driven in; it filled, sunk, and upset in a moment. Assistance was providentially at hand, so that we were all taken up without injury, after being but a few minutes in the water. The whale escaped; the boat's lines fell out and were lost, but the boat was recovered.

A remarkable instance of the power which the whale possesses in its tail, was exhibited within my own observation, in the year 1807. On the 29th of May, a whale was harpooned by an officer belonging to the Resolution. It descended a considerable depth; and, on its re-appearance, evinced an uncommon degree of irritation. It made such a display of its fins and tail, that few of the crew were hardy enough to approach it. The captain, (my Father,) observing their timidity, called a boat, and himself struck a second harpoon. Another boat immediately followed, and unfortunately advanced too far. The tail was again reared into the air, in a terrific attitude,—the impending blow was evident,—the harpooner, who was directly underneath, leaped overboard,—and the next moment the threatened stroke was impressed on the centre of the boat, which buried it in the water. Happily no one was injured. The harpooner who leaped overboard, escaped certain death by the act,—the tail having struck the very spot on which he stood. The ef-

fects of the blow were astonishing. The keel was broken,—the gunwales, and every plank, excepting two, were cut through,—and it was evident that the boat would have been completely divided, had not the tail struck directly upon a coil of lines. The boat was rendered useless.

Instances of disasters of this kind, occasioned by blows from the whale, could be adduced in great numbers,—cases of boats being destroyed by a single stroke of the tail, are not unknown,—instances of boats having been stove or upset, and their crews wholly or in part drowned, are not unfrequent,—and several cases of whales having made a regular attack upon every boat which came near them, dashed some in pieces, and killed or drowned some of the people in them, have occurred within a few years, even under my own observation.

Boats, together with their Crews and Apparatus, projected into the Air.—The Dutch ship Gort-Moolen, commanded by Cornelius Gerard Ouwekaas, with a cargo of seven fish, was anchored in Greenland in the year 1660. The captain, perceiving a whale a-head of his ship, beckoned his attendants, and threw himself into a boat. He was the first to approach the whale; and was fortunate enough to harpoon it before the arrival of the second boat, which was on the advance. Jacques Vienkes, who had the direction of it, joined his

captain immediately afterwards, and prepared to make a second attack on the fish, when it should remount again to the surface. At the moment of its ascension, the boat of Vienkes happening unfortunately to be perpendicularly above it, was so suddenly and forcibly lifted up by a stroke of the head of the whale, that it was dashed to pieces before the harpooner could discharge his weapon. Vienkes flew along with the pieces of the boat, and fell upon the back of the animal. This intrepid seaman, who still retained his weapon in his grasp, harpooned the whale on which he stood; and, by means of the harpoon and the line, which he never abandoned, he steadied himself firmly upon the fish, notwithstanding his hazardous situation, and regardless of a considerable wound that he received in his leg, in his fall along with the fragments of the boat. All the efforts of the other boats to approach the whale, and deliver the harpooner, were futile. The captain, not seeing any other method of saving his unfortunate companion, who was in some way entangled with the line, called to him to cut it with his knife, and betake himself to swimming. Vienkes, embarrassed and disconcerted as he was, tried in vain to follow this counsel. His knife was in the pocket of his drawers; and, being unable to support himself with one hand, he could not get it out. The whale, mean while, continued advancing along the surface of the water with great rapidity, but fortunately

never attempted to dive. While his comrades despaired of his life, the harpoon by which he held, at length disengaged itself from the body of the whale. Vienkes being then liberated, did not fail to take advantage of this circumstance; he cast himself into the sea, and, by swimming, endeavoured to regain the boats which continued the pursuit of the whale. When his shipmates perceived him struggling with the waves, they redoubled their exertions. They reached him just as his strength was exhausted, and had the happiness of rescuing this adventurous harpooner from his perilous situation *.

In one of my earliest voyages to the whale-fishery, I observed a circumstance which excited my highest astonishment. One of our harpooners had struck a whale, it dived, and all the assisting boats had collected round the fast-boat, before it arose to the surface. The first boat which approached it advanced incautiously upon it. It rose with unexpected violence beneath the boat, and projected it and all its crew, to the height of some yards in the air. It fell on its side, upset, and cast all the men into the water. One man received a severe blow in his fall, and appeared to be dangerously injured;

* I give this ancedote on the authority of the author of the Histoire des Pêches, who translated it from the Dutch. Part of the story bears the marks of truth; but some of it, it must be acknowledged, borders on the marvellous.

but soon after his arrival on board of the ship, he recovered from the effects of the accident. The rest of the boat's crew escaped without any hurt.

Captain Lyons of the Raith of Leith, while prosecuting the whale-fishery on the Labrador coast, in the season of 1802, discovered a large whale at a short distance from the ship. Four boats were dispatched in pursuit, and two of them succeeded in approaching it so closely together, that two harpoons were struck at the same moment. The fish descended a few fathoms in the direction of another of the boats, which was on the advance, rose accidentally beneath it, struck it with its head, and threw the boat, men and apparatus, about fifteen feet into the air. It was inverted by the stroke, and fell into the water with its keel upwards. All the people were picked up alive by the fourth boat, which was just at hand, excepting one man, who having got entangled in the boat, fell beneath it, and was unfortunately drowned. The fish was soon afterwards killed. The engraving which forms the frontispiece to this volume, executed from an original drawing by James Waddel, Esq., is illustrative of this accident.

SECT. XVI.

Proceedings in a Greenland Ship, from leaving the Fishing Stations, to her arrival in Britain.

WHEN a ship has on board an ample cargo, or when the fogs set in, and the whales totally disappear, so as to put a period to the fishery for that season, there remains no sufficient motive to induce farther stay in the country; the course of each ship is, therefore, directed immediately homeward.

It is not unusual for a ship to bear away, without the navigators having first obtained any certain knowledge as to their situation in longitude. Not having, perhaps, seen any land for some weeks, or even months, or possibly not since their arrival on the fishing stations; having neither a chronometer on board, nor the means of taking a lunar observation; they set out ignorant of the meridian on which they sail, and sensible of their being liable to an error of 5 or 6 degrees of longitude. In such cases, they steer a south-westerly course by the compass. If they happen to be in a more westerly situation than they expect, an increase in the westerly variation reacts a little in their favour; and if they prove to be farther easterly, a decrease of the variation of the compass, tends to give them more westing than

they calculate upon. The increase of variation with the longitude in a westerly direction, acts, therefore, in the navigator's favour, but only in a trifling degree. In another respect, however, this regular alteration of the variation serves to point out the situation of the ship in longitude, within 2° or 3°, when a sufficiently delicate instrument is on board for observing the variation with accuracy.

If the homeward bound Greenlandmen steer too far to the eastward, they make the coast of Norway, and if too far to the westward, they probably make Feroe. The appearance of certain birds, sea-weeds and medusæ,—sudden alterations in the swell,—and the examination of the depth of the water, are the principal intimations which give them a knowledge of their situation. The appearance of sea-weeds and medusæ in the water, and of solan geese, skua-gulls and land birds on the wing, denote their proximity to land. A westerly swell generally prevailing between the latitudes of 60° and 65°, its sudden cessation indicates shelter from some land. If, in the 62d or 63d degree of latitude, the westerly swell be suddenly obstructed, it is evident that the Feroe Islands are not far distant to the westward; but if the same effect takes place in the 61st degree, it denotes the proximity of Shetland to the westward.

Subject to mists as the Shetland Islands are, the navigator, in thick stormy weather, is sometimes exceedingly embarrassed in approaching them. Possessing no satisfactory knowledge of his situation, he cannot, perhaps, determine, whether he be on the east side or west side, or on the meridian of these islands. In the latter case, he apprehends danger from the Skerries, which lie on both sides of the land, at a considerable distance from the main, some of which are so small, low and rocky, that, in bad weather, or in the night, they constitute a very formidable source of danger. He apprehends some little risk of running to the westward of Orkney, if he be much to the westward of Shetland, or of being detained on the coast of Norway, if he prove to be on the east side. The westerly winds, which are here prevalent about the middle and latter end of summer, though tolerably favourable for a ship in a fair way, between Shetland and Norway, retard such as happen to be on the coast of Norway, especially if they be unable to clear the land on the starboard tack.

In approaching Shetland in foggy weather, or during the night, the soundings are the only satisfactory guide. If the navigator be pretty certain of his latitude, and try for soundings in the parallel of 60½ or 61 degrees, he will have no bottom with 100 or 120 fathoms of line, at the distance of thirty miles from the west side of Shetland: but on the

east side, he will have soundings in 70 or 80 fathoms, fine sand, or sand and shells, midway between Shetland and Norway; coarser soundings, with some increase of depth nearer to Shetland; and no bottom at 120 fathoms, within sight of the Norway land. The circumstance, therefore, of obtaining soundings, is the general criterion of being in east longitude; and of finding no bottom, of being to the westward of Shetland in west longitude.

In the year 1812, I steered into the latitude of 60°, in longitude by lunar observation about $3\frac{1}{2}$° W. As a matter of curiosity, I tried for soundings, and, to my great surprise, found bottom in 73 fathoms. Had I not had the greatest confidence in my lunar observation, (especially as we had left Greenland without obtaining any departure, and without having seen land for two months previous,) I should, undoubtedly, have steered a south-westerly course, which would have run us to the westward of Scotland. My mate, and some other experienced officers on board, felt assured that we were to the eastward of Shetland. Such, however, was my confidence that we were to the westward, that we sailed 18 miles to the eastward, struck soundings in 45 fathoms, rocks and shells, and then 20 miles farther on an E. by S. course, when our soundings were 60 fathoms, shells. The weather had previously been clear, but it was now dark. On calculating from my lunar observation the position of the ship, the island of Fula appeared to be at the distance of 10 miles, bearing

north. We stood off and on during the night, and at day light descried the very island of Fula, bearing N. N. E. distant 15 or 20 miles! I mention this circumstance thus particularly, because I feel assured, that such is the confidence Greenland captains in general have in their easterly situation when they find soundings, that, without the same advantage of a lunar observation as I on this occasion possessed, it is highly probable they would have run to the westward of Britain altogether.

An accurate survey of the Shetland islands, with particular soundings on every side, marking the exact situations where soundings, with a certain length of line, can no longer be obtained, would be a great advantage both to the Greenland and Archangel trade.

Besides the great call for a survey of the Shetland Islands and the soundings around them, another great safeguard to this navigation, would be the erection of Light-houses on two or three of the most dangerous and prominent parts of the coast *. To advance in the night towards this coast, where rocky islands abound, and strong tides prevail, is a

* My friend Mr Stevenson, the distinguished Engineer to the Commissioners for Northern Light-houses, informs me that, on the motion of William Erskine, Esq. Sheriff of Orkney and Shetland, the Board has recently resolved to erect light-houses on the Shetland Islands, beginning with one on Sumbrough-Head. The advantages will be great; and, at the same time, I understand, will infer no additional charge on the shipping.

hazardous undertaking, neither is it altogether safe to *lie-to* near it; for ships which have lain-to in the evening, at the distance of five or six leagues from Sumbrough-Head, (the southern extremity of Zetland), have sometimes been swept by the tide to within a few furlongs of the shore, in the space of two or three hours! This remarkable effect of a tide, the nature of which is but very imperfectly known, I myself experienced in the Esk, in the year 1814. The circumstances were as follow: In the evening of the 26th of March, we passed Fair Island, with a south wind. The weather being stormy and hazy, we reefed our sails, and hauled to the eastward at 8 P. M., being then 10 miles S. W. by S. from the southern point of Shetland. We proceeded on an E. S. E. course, under easy sail, supposing ourselves quite out of the influence of any rapid tide, and consequently in safety; meaning to stand off and on during the night, and proceed to Lerwick after day-break. I had just retired to rest, when the officer of the watch called out, "*Land.*" I jumped upon deck, and, incredible as it was, saw a lofty peak of land, scarcely two miles distant, under our lee, and presently afterwards observed land a-head, and to windward! The night being tempestuous and dark, our situation was very alarming. The ship was instantly "weared," a smart sail set, and we soon cleared the land to the westward. I recognized the land to be Fitfil-Head; consequently the ship must

have been drifted by the tide into Quendale Bay; a small inlet at the southern extremity of Shetland. We stretched to the westward about three hours, and then returned, supposing, from the state of the sea, that the ship could not have fetched the land we had before seen; but the influence of the returning tide had caught us, and to our surprise at day-light, though the atmosphere was not foggy, no land was in sight! Soon afterwards, however, a certain haziness in the atmosphere dispersed, and Fair Island made its appearance, bearing west, and Sumbrough Head N. N. E. 12 miles distant. From a correct estimation of the courses and distances steered, I ascertained, that in the evening (8 to 10 P. M.) the ebb-tide had carried us N. $\frac{3}{4}$ E. *per* compass, 11 miles in two hours; and that during the night, the flood-tide had taken us in the opposite direction about 12 miles. Our situation at day-light, indeed, was almost precisely the same as that where we had hauled the wind the night before; and had we not had certain evidence of having seen the land, we should have supposed we had been deceived.

Vessels returning from Greenland or Archangel, are so very liable to make the coast of Norway, when the navigators imagine themselves at the distance of some degrees, that the circumstance is notorious. An error of 5 or 6 degrees of longitude, in the reckoning of a Greenland ship, is by no means uncommon, notwithstanding the coast of Spitzbergen

may have been seen immediately before setting out on the passage homeward. As this error is invariably in one direction, the cause must be regular. Ships which have made the Norway land, have been frequently supposed to be steering direct for Shetland. This error has usually been attributed to an easterly current; if such a cause, however, do operate at all, most certainly it is not the sole cause. There is little doubt but it is chiefly owing to the increase of the westerly variation of the compass, in consequence of the "local attraction" of the ship on the magnetic needle, when steering on a course to the westward of the magnetic meridian; and partly to an error in the departure of the Greenland ships, arising from the situation of the southern parts of Spitzbergen being laid down 3 or 4 degrees too far to the westward in the charts.

That there is a kind of focus or centre of attraction in every vessel, towards which, in north latitude, the north point of the compass is invariably drawn, is a fact which is now sufficiently established. When the compass, therefore, is placed near the stern of the vessel, which is its usual situation, its north point in the northern hemisphere, is attracted towards the centre of the ship. Hence, if the ship's head is directed towards the west, the north point of the compass being deflected forward, produces an error of a quarter to half a point towards the north, in very high latitudes, and an

equal error in the same direction when sailing on an east course; so that when a ship's head, by the compass placed near the middle of the quarter-deck, appears to be west, it is actually W. $\frac{1}{4}$ S. or W. $\frac{1}{2}$ S. compared with the true magnetic meridian; and when it appears to be east, it is E. $\frac{1}{4}$ S. or E. $\frac{1}{2}$ S. On more oblique courses, such as N. E., S. E., S. W. and N. W. the *equation* or *anomaly of variation*, though less considerable, is still very perceptible. A ship steering with a fair wind from Greeenland, S. W. $\frac{1}{4}$ W. by the compass, scarcely makes good a S. S. W. course, though the variation should be but two points. This quarter point of attraction or anomaly of variation, all the way from latitude 78° to 61°, a distance of 1020 miles, occasions an error of 152′ of longitude, or about $2\frac{1}{2}$ degrees, which the reckoning will be to the westward of the ship *. This, of itself, is nearly sufficient to account for the frequent mistakes which are made, but amply so if we view it in connection with the liability to err, occasioned by the insufficiency of the usual allowances made for lee-way, when westerly winds prevail, together with the other source of error already mentioned, in the departure

* This subject, the anomaly of variation, having been considered more at large in the First Volume of this Work, it is unnecessary to state in this place the facts and observations from which the above conclusions are derived.

from Spitzbergen, which operates in the same direction.

Hence, where there are such prevailing sources of error, and these, instead of compensating each other, all tending in the same direction, celestial observations become of the greatest importance. As, however, the prevalence of cloudy or foggy weather admits of but few opportunities of taking lunar observations, the chronometer, from the facility with which the time may be generally got, becomes a most useful instrument. But as accidents have rarely arisen from the want of a chronometer, detention only in the passage being the usual consequence, this inconvenience is not considered of sufficient importance to bring chronometers into general use in this navigation.

SECT. XVII.

Legislative Regulations on the Importation of the Produce of the Northern Whale-Fisheries.

IMMEDIATELY on the arrival of a fishing ship at the port from whence she sailed, the mustering officer of the customs repairs on board, receives the manifest of the cargo *, with a true copy thereof,

* A *manifest* is a kind of schedule in writing, signed by the master of the vessel, containing the name or names of the place

examines into the identity and number of the crew, by the usual form of mustering, and places an officer or two on board to take charge of the cargo on the part of the revenue. The duty of these officers is to take account of every cask or other article of which the cargo consists, as it is discharged from the ship, and one of them to accompany the same to its destination, carrying an account thereof in writing, and not quitting the lighter wherein it is contained until he is relieved by another officer, who is placed in the capacity of *landing-waiter* on the premises, where the blubber is warehoused or boiled.

Within twenty-four hours after the ship arrives in port, the master is required, under the penalty of 100 *l.*, to attend at the customhouse, to make his report, that is, to make affidavit of the built, burden and cargo of the ship he commands; on which occasion he must deliver his manifest to the

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or places where the cargo was laden: the name of the master; the name, admeasurement, and built of the vessel; and the port to which she belongs; and a true account and description of every individual part of the cargo.—26th Geo. III. c. 40. § 1.

Goods imported in a British vessel, into a British port, without being regularly described in the manifest, renders the master or commander of the vessel, liable to forfeit double the value of such goods, together with the full duties payable on the same.—26th Geo. III. c. 40. § 5.

collector or other chief officer, (if it has not before been demanded of him,) under the penalty of 200*l.* * At the same time, the log-book must be produced; and its contents, as required by law †, verified on the oath of the master and mate; and affidavit also made by the same persons, of their faithful dealings, according to the requirements of law, during the voyage. After these things are accomplished, the mustering officer's certificate, and schedule of the crew, the commissioners' licence, and the affidavits of master and mate, are transmitted to the commissioners, who, being satisfied of the faithfulness of all the proceedings, are required to order payment of the bounty on demand ‡.

Previous to the cargo being admitted to entry, free from the duties imposed on the produce of foreign fishing, the owner, importer, or consignee of the cargo, together with the master or commander of the vessel, must severally make oath, each to the best of his knowledge and belief, that the said cargo was the produce of fish, &c. actually caught by the crew of a British built vessel, wholly owned by his Majesty's subjects, usually residing in Great Britain, &c. registered and navigated according to law §.

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* 26th Geo. III. c. 40. § 11.

† 26th Geo. III. c. 41. § 10.

‡ 26th Geo. III. c. 41. § 6.

§ 49th Geo. III. c. 98. § 37. Appendix No. I. & IV.

The importer or consignee of any goods imported into Britain, is required, within twenty days after the master shall have made his report, under certain penalties, to make a due *entry* with the collector or other chief officer of the customs at the port where the ship shall arrive, of all the goods by him imported therein, and pay the full duties thereon *. In the whale-fishery trade, however, the duties are not usually paid until the blubber is reduced into oil, and the exact produce thereof ascertained, though the time exceed the twenty days allowed by the above act †; but should the proprietors have occasion to send any part of the produce away before the whole cargo is boiled off, entry must be made of such quantity at least, and the duty chargeable on it paid, before it can be allowed to be removed from under the eye of the superintending officer appointed by the Customs.

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* 26th Geo. III. c. 40. § 14.

† By act 49th Geo. III. c. 68.; and 39th & 40th Geo. III. c. 51. § 1., blubber is allowed to be boiled into oil, under the inspection of the proper officers, and such oil admitted to entry, and the duties paid thereon.

CHAPTER V.

ACCOUNT OF THE DAVIS' STRAITS WHALE-FISHERY, AND A COMPARISON WITH THAT OF GREENLAND, WITH STATEMENTS OF EXPENCES AND PROFITS OF A FISHING SHIP.

SECT. I.

Some Account of the Whale-Fishery, as at present conducted in Davis' Straits, and on the Coast of Labrador.

THE manner of conducting the fishery in Davis' Straits, being so very similar to the proceedings in the Greenland fishery, I shall only notice briefly, such circumstances as are peculiar to the former.

Ships intended for Davis' Straits, commonly put to sea a little earlier than the Greenland ships. A few years ago, they were in the habit of sailing in the latter part of February; but, at present, they seldom leave their ports before the beginning or middle of March. On their passage outward, the Davis'

Straits fishers usually touch at Orkney or Shetland, for the purpose of procuring men, and such trifling stores as are furnished at a cheap rate in these islands, together with a view of trimming and preparing their vessels for accomplishing the passage across the Atlantic.

In consequence of the frequent storms and high seas which prevail in the spring of the year, the passage across the Atlantic is often attended with difficulty. Instead of steering direct for the southern point of Greenland, which lies in about 59½° north latitude, this navigation is usually performed in the parallel of 58°, for the purpose of avoiding a dangerous body of heavy drift ice, which sometimes extends to a considerable distance to the southward of Cape Farewell. After sailing 5° or 6° of longitude to the westward of the Cape, a more northerly course is generally pursued, until the ships fall in with the Labrador ice, in the parallel of 61° or 62°. The greatest danger in this navigation is from icebergs, which the whalers are constantly liable to meet with after passing the meridian of Cape Farewell, up to their arrival at the face of the ice, connected with the shore of Labrador. In the night, or in thick weather, they are particularly hazardous, and especially in storms. In moderate winds, indeed, such an intimation of their proximity is derived, either from their natural effulgence in some states of the atmosphere, or from their intense blackness in

others, that they can be generally avoided. But in storms, when a ship ceases to be under command, they become one of the most appalling dangers which can be presented to the navigator.

In the Spitzbergen seas, though the ice is equally dangerous to the shipping, and is often the occasion of their loss,—though it presents a frightful appearance and a most formidable danger,—yet it seldom proves fatal to the navigators, as they can commonly escape upon it, and sustain themselves till an opportunity of making their escape is presented. But the danger from ice-bergs is more dreadful.

Two most fatal shipwrecks have occurred in the Davis' Straits fleet, within the last five years. The Royalist, Captain Edmonds, and the London, Captain Mathews, having been lost with all hands; the former among ice-bergs in 1814, and the latter, it is supposed, in a similar way, in 1817. Little is known respecting these distressing events, especially with regard to the London. As to the other ship, however, I have received a few particulars from an intelligent seaman, Captain Bennet of the Venerable, who was in company with the Royalist immediately before she was wrecked. April the 14th, the Venerable was in latitude 61° 7′, longitude by estimation 56° 13′ west; the Royalist in company. They fell in with drift ice at 8 A. M., when a heavy gale of wind commenced, and conti-

nued twelve hours, after which the wind abated; but suddenly veering to the N. W. a tremendous storm arose, which, accompanied with sleet or snow, continued without intermission during twenty hours. Before dark of the 15th (nautical day), Captain Bennet saw several ice-bergs, at which time he believed the Royalist was lying to windward of an extensive chain of these islands of ice, among which she was wrecked in the course of the same night. The unfortunate crew probably perished immediately, as the sea was uncommonly high.

A subscription was opened at Hull by the owners of the whalers, which met with liberal support from the humane of other classes of people, both in this and in neighbouring towns. The sum raised amounted to 1122*l.* 13*s.* 6*d.*, which was divided in the following manner. To the captain's widow, 216*l.* 11*s.* 3*d.*; to the widow of the chief mate, 51*l.* 19*s.* 6*d.*; and to the widows and families of the rest of the crew certain monthly shares, proportionate to the number and age of their children, until the whole was expended.

The London was lost about the same situation in the year 1817. A subscription, amounting to 530*l.* 11*s.*, raised chiefly by the people of Hull, was divided among the widows and families of the crew in the manner following. To the widow of the captain, 42*l.*; three shares *per* month, of 7*s.* each, to every other widow; and one share *per* month to

every child under fourteen years of age. The last monthly payment was made on the 24th of December 1818*.

The fishery on the coast of Labrador commences occasionally in the month of March. On this station, which is inhabited by a large description of whales, some fishers have persevered altogether, and have sometimes procured great cargoes. It is, however, a dangerous fishery. The nights being long and dark on their first arrival, they are obliged to use lanterns in their boats, when fish happen to be struck, or to remain unsubdued at the close of day, for the purpose of keeping the ships and boats together; on which occasions, the stormy weather that frequently occurs at this season, exposes them to continual danger. Those who prosecute the northern fishery, after making the ice at the "South-West," as the neighbourhood of the Labrador coast is usually denominated, proceed almost immediately up Davis' Straits, towards Baffin's-Bay. If, in the month of April or beginning of May, they commence this navigation, and sail along the edge of the western ice to the

* Captain Bennet's communication by letter.—It is somewhat remarkable, that Captain Mathews of the London, who perished when his ship was lost, was engaged as chief-mate of the Royalist, for the voyage in which she was wrecked, but, by some accident, was prevented from sailing in her. In the first instance, he had an extraordinary escape from premature death, and yet three years afterwards he suffered a similar calamity.

northward, they often find it joining the ice connected with the west coast of Greenland, in the latitude of $66\frac{1}{2}°$ or 67°, and meet with a considerable barrier of it in 68°, immediately beyond which, a few leagues from land, is a good fishing station. As the ice opens to the northward, the whales retreat in that direction, and the fishers follow as promptly as possible. The whalers often reach Disko early in May; but it is generally the latter end of this month, or the beginning of June, before they can pass the second barrier of ice, lying about Hare Island, in the 71st degree of latitude, and enter the northern inlets frequented by the whales. The three inlets, called the South-east Bay, Jacob's Bight, and the North-east Bay, were most productive fishing stations a few years ago; but of late they have afforded but few whales. From hence, if no fish are found, the whalers proceed to the western part of the Straits, towards Cumberland Island, or persevere along the east side of Davis' Straits towards Baffin's Bay; to the extreme parts of which the fish appear to retreat as the season advances, and as the ice clears away from the northern and eastern shores.

Perhaps the following may be considered as an eligible plan of fishing on a Davis' Straits voyage. To proceed at the usual season, and in the usual manner, to the drift-ice bordering the coast of Labrador, where whales, though not in great numbers, usually remain during a great part of the

season, and there to persevere in the fishery until the latter end of April or beginning of May, by which time the fish at the South-West sometimes retire into the ice or to the northward; then to follow the whales which go north, and attack them in latitude 65° or 66°, where they occasionally make a halt. About the middle of May to proceed up the Straits, try the fishing station in the 69th degree, then the western part of the Straits, when open, in the 70th or 71st degree, and on the first opening of the ice near Hare Island, to explore the inlets in latitude 71° and 72°. If considerable success has not, by that time, been obtained, to proceed up Baffin's Bay as the ice clears away, to the farthest navigable point, where a reasonable prospect of success is always offered. The farthest point attained in the month of June will, perhaps, not be above the 72d or 73d degree of latitude; but in the month of July or early in August, the extreme parts of Baffin's Bay will probably be open, and afford a productive fishing station, should all others fail. Thus, the fishery of Davis' Straits may be extended, in one season, during six months, instead of four or five, the usual interval; and, at all times, with a more than ordinary probability of success.

At the South-West, in latitude 61° or 62°, fish have been killed in the month of July, but only in icy situations, near the Labrador coast.

In Baffin's Bay, and in the inlets of West-Greenland, the fishery is conducted under the most favour-

able circumstances. The water being shallow in many situations, the boats require only a small quantity of line; and the weather being warm, the sailors perform their occupations, if not with pleasure, at least with comfort to themselves. But at the South-West, each operation of the fishery is performed under rather unpleasant and even dangerous circumstances. Darkness of night, exposure to storms, and frequency of swells, are all unfavourable to the fishers. The flensing of a whale at the South-West, is usually more troublesome and more hazardous than elsewhere, owing to the prevalent swell which rarely altogether subsides.

Davis' Straits fishers, within the present century, after making a successful fishery at a distance from land, have been in the habit of resorting to the bays, and there mooring in safety, until the troublesome process of making-off was accomplished.

On the passage homeward, the ships usually steer down the middle of the Straits, and proceed sufficiently far south for avoiding the "Cape-ice," before they haul up to the eastward. From thence, the prevalence of westerly winds in the summer season, generally affords them an easy passage across the Atlantic. Their course is nearly due east; which being on a parallel of latitude, they can have no difficulty in finding Shetland, Orkney, or the north-west coast of Scotland, accordingly as they may wish; their only particular caution being to keep a good look-out for land, some time before they may

calculate on its proximity, in case of an error in their longitude. In Orkney, the men taken on board on the outward passage, are landed on their return; and the crew are mustered, when the number of men engaged at the port from which the vessel sailed, was not sufficient for performing this legal ceremony at home. These matters accomplished, the ship proceeds immediately to her port.

The legislative regulations on the importation of Davis' Straits produce, are the same as on cargoes obtained in the Greenland fishery.

SECT. II.

Comparative View of the Fisheries of Greenland and Davis' Straits.

HITHERTO, the comparative advantages of the fisheries of Greenland and Davis' Straits have been entirely matter of opinion, no one having, I believe, taken the pains to make correct estimates on the subject. It may, therefore, be worth while to give the result of some calculations, made with a view of ascertaining the relative value of the two fisheries to individuals who embark their property in the trade.

Among the Dutch fishers, we find that, during a period of 107 years, included between 1669 and 1778, each ship in a fleet of 132 sail, which pro-

ceeded annually to Greenland, afforded to the owners, on an average, a profit of 3126 florins; and that in a period of 60 years, ending with 1778, a fleet of 53 ships, which sailed annually to Davis' Straits, realized to the owners a profit of 3469 *f.* *per* voyage: thus, exceeding the produce of the Greenland fishery by 343 *f.* on each ship *per* voyage; after ample allowance is made for the greater length of the voyage to Davis' Straits, together with the additional wear and tear.

Among the British fishers, the advantage seems also to have been on the side of Davis' Straits, particularly of late years. In the four years ending with 1817, the Greenland fishery has produced on an average 88 tons of oil, and 4 tons 9½ *cwt.* of whalebone *per* ship, each voyage; but the Davis' Straits fishery has, during the same period, averaged 102 tons of oil, and 4 tons 16¾ *cwt.* of whalebone *per* ship; exceeding the average cargo of the Greenland ships by 14 tons of oil and 7¼ *cwt.* of whalebone, value, according to the mean rate of oil and fins, about 530 *l.* But from this, if we deduct the value of skins taken by the Greenland fishers, but not estimated in their cargoes, say 20 *l.* to 30 *l.* *per* ship, and the additional expences of a Davis' Straits voyage, occasioned by the greater wear and tear, and the provisions and wages for a voyage longer by one or two months than that to Greenland, we shall reduce the balance in favour of the Davis' Straits fishers to a very small sum.

During the above four years, the amount of the cargoes of the British Greenland whale-fishing ships, (consisting of 376 sail, repeated voyages included,) was 3508 whales, which produced 33,070 tons of oil, and 1682 tons of whalebone. At the same time, 210 ships employed in the Davis' Straits fishery, procured 1522 whales, yielding 21,438 tons of oil, and 1015 tons of whale-fins.

It seems worthy of remark, that the whales caught near Spitzbergen, afforded a larger proportion of whalebone, compared with the quantity of oil, than the fish of Davis' Straits; the Greenland fish yielding a ton of fins for every 19½ tons of oil, and the Davis' Straits fish a ton of fins for every 21 tons of oil. It is remarkable that this should have been the case, when we consider that small fish afford less whalebone than large fish, in proportion to their produce in oil, and yet the Greenland fish which, on the average of four years, were much smaller than those caught in Davis' Straits, have produced the largest proportion of whalebone. The whales taken at the Greenland fishery in four years, only average 9½ tons of oil each, but those caught at Davis' Straits average 14 tons. It would therefore appear, that the large whales caught near Spitzbergen are much stouter than those taken in Davis' Straits, and afford so much greater a proportion of fins, as more than compensates for the deficiency in the small whales.

SECT. III.

Statements of Expences and Profits on some Whale-fishing Voyages.

The fluctuating value of shipping, renders it difficult to give a fair estimate of the expences of a whale-ship. The Resolution of Whitby, burden 291 tons, when new, in the year 1803, cost but 7791 *l.*, including all expences of stores and outfit, premiums of insurance, and advance money of seamen; while the Esk, of 354 tons admeasurement, launched and fitted out of the same port in 1813, cost above 14,000 *l.*

The following statement shows the cost and expences of the ship Resolution, before putting to sea, on her first voyage, in the year 1803.

	L.	S.	D.
Cost of the ship's hull,.....	2320	10	0
Expences of doubling, fortifying, &c....	471	7	5
Mast-maker's and joiner's bills,.....	505	18	4
Sail-maker's bill,.....	240	11	5
Cordage,—Rigging, and cables,.....	580	11	0
———Whale-lines, &c.....	276	6	5
Rigger's bill,.....	33	2	4
Boat-builder, for 7 boats,.....	144	1	11
Carried forward,	L. 4572	8	10

Brought forward,	L. 4572	8	10
Oars, timber, deals, harpoon-stocks, &c.	45	17	1
Iron-work.—Anchors,	66	11	4
——— Ice-saws, ice-anchors, &c.	35	12	0
——— Cooking-hearth,	20	0	0
——— Harpoons, lances, knives, &c.	189	7	9
Cooper's bill for casks,	1091	14	8
Ship-chandler's bill,	69	1	9
Painter's bill,	37	19	8
Plumber and glazier's bill,	20	15	10
Sundries,	171	14	5
Expences of outfit.			
Provisions, Coals, &c.	769	1	11
Insurance against sea and enemy,	413	3	0
Advance money to seamen, &c.	287	19	2
	L. 7791	7	5

This ship was sold in eight shares; and the sum subscribed by the owners, and deposited in the hands of the managing-owners, was 8000 *l.* The expences incurred, and the profits realized by this adventure, during fifteen voyages, are exhibited in the following statement *.

* I am indebted to my friends Messrs Fishburn and Brodrick, managing owners of the Resolution, for the documents from which this statement was drawn up.

STATEMENT.

PAID.	L.	s.	d.
1803. Amount advanced by the owners,	8000	0	0
1804. One year's interest on capital,	400	0	0
Expences on the 1st, and outfit of the 2d voyage, - - -	4008	18	4
1805. Expences 2d, and outfit 3d voyage,	4476	2	6
Interest of capital, - -	300	0	0
1806. Expences 3d, and outfit 4th voyage,	4679	11	5
Interest of capital, - -	200	0	0
1808. Expences 4th & 5th, and outfit of 5th & 6th voyages, -	9216	14	6
Interest of capital, (2 years) -	200	0	0
1809. Expences 6th, and outfit 7th voyage,	5823	14	4
Interest of capital, -	20	0	0
1810. Expences 7th, and outfit 8th voyage,	4729	11	8
1811. ——— 8th, ——— 9th ———	4722	11	5
1812. ——— 9th, ——— 10th ———	5149	10	3
1813. ——— 10th, ——— 11th ———	5432	3	8
1814. ——— 11th, ——— 12th ———	4270	13	2
1815. ——— 12th, ——— 13th ———	5455	5	6
1816. ——— 13th, ——— 14th ———	2701	19	9
1817. ——— 14th, ——— 15th ———	3210	2	7
1818. ——— 15th, ——— 16th ———	2839	18	11
Balance in favour of the owners,	19473	10	2
	L. 95340	8	2

RECEIVED.	L.	s.	d.
1804. Proceeds of the cargo and bounty 1st voyage, - - -	6864	10	5
1805. Cargo and bounty 2d voyage,	6568	1	0
1806. ——— 3d ———	6287	10	9
1808. ——— 4th & 5th voyages,	10428	7	11
1809. ——— 6th voyage,	7157	8	6
1810. ——— 7th ———	8275	14	6
Premium on capital, -	60	0	0
1811. Cargo, &c. 8th voyage,	8195	16	10
Premium on capital, -	180	0	0
1812. Cargo, &c. 9th voyage,	7385	2	10
Premium on capital, -	340	0	0
1813. Cargo, &c. 10th voyage,	7834	19	6
Premium on capital, -	500	0	0
1814. Cargo, &c. 11th voyage,	6049	11	7
Premium on capital, -	660	0	0
1815. Cargo, &c. 12th voyage,	8426	16	5
Premium on capital, -	740	0	0
1816. Cargo, &c. 13th voyage,	433	9	2
Premium on capital, -	860	0	0
1817. Cargo, &c. 14th voyage,	2866	7	7
Premium on capital, -	860	0	0
1818. Cargo, &c. 15th voyage,	3506	11	2
Premium on capital, -	860	0	0
	L. 95340	8	2

Hence the balance in favour of the owners of the Resolution, for fifteen voyages, appears to be 19,473*l.* 10*s.* 2*d.*, besides the value of the ship, and the value of the outfit for the sixteenth voyage. If we reckon these at 6500 *l.* the profit derived from 8000*l.*, originally advanced, in addition to the interest of the capital embarked, will amount to about 26,000 *l.*, notwithstanding the last three voyages were but indifferent; of which sum, 25,200 *l.* has actually been divided. To present this statement without some qualification, however, would give a very erroneous view of the general advantages of the fishery to individuals; it is therefore necessary to mention, that the Resolution, in her first ten voyages, procured 600 or 700 tons of oil, above the average of the fishery, during that period, if not more.

The usual expences of a Greenland voyage, including outfit, when no cargo is obtained, may be stated at 2200 *l.* exclusive of interest of capital, and wear and tear. For every ten tons of oil procured, there will be an additional expence of 80 *l.* or 90 *l.* for discharging and boiling the cargo, for oil-money and fish-money, and for other extraordinaries connected with a successful fishing. Thus the expence of a ship, with a cargo of 200 tons of oil, will be at least, 4000 *l.* These expences, however, will vary with the kind of wages paid to the captain and crew,—with the nature of the equipment,—and, in some measure, with the price of oil.

CHAPTER VI.

METHOD OF EXTRACTING OIL AND PREPARING WHALEBONE, WITH A DESCRIPTION OF THESE ARTICLES, AND REMARKS ON THE USES TO WHICH THE SEVERAL PRODUCTS OF THE WHALE-FISHERY ARE APPLIED.

SECT. I.

Description of the Premises and Apparatus used in extracting Oil out of Blubber.

On the margin of the river, wet-dock, canal, or other sheet of water, communicating with that wherein the whale-fishing ship discharges her cargo, are usually provided the necessary premises for reducing the blubber into oil, consisting commonly of the following articles.

1. A copper vessel or boiler, 3 to 6, or even 10 or more tons capacity, of a circular form in the horizontal view, and elliptical in the perpendicular section, is fixed at the elevation of 6 to 10 feet above the ground,

provided with an appropriate furnace, and covered with a tiled or slated shed. Some of these *coppers* have a sudden depression in the bottom, into which the refuse of the blubber subsides when it is sufficiently boiled; and at the elevation of a foot or 18 inches above the bottom, (higher than the cavity usually occupied by the refuse,) is a grating and conducting pipe, through which, on turning a stop-cock, the greater part of the oil in the copper is conveyed into an adjoining cooler.

2. On the same, or on a little lower level than that of the copper, is fixed a square or oblong back or cooler, built generally of wood, but sometimes of brick or stone, lined with lead or cement, capable of containing from 10 to 20 tons of oil or upwards. Adjoining to this is another back, sometimes a third, and occasionally a fourth or a fifth, each placed a little lower than the one preceding it, so that the lowest shall stand with its base about two or three feet above the level of the ground. In some very modern *works*, the coolers are all fixed at the same elevation. Each of the backs is provided with one or more stop-cocks on the most accessible side, for convenience in drawing the oil off into casks.

3. Altogether above the level of the copper, and immediately adjoining it, on the side directed towards the river or canal, an oblong wooden cistern, called the "starting-back," is usually erected, for containing blubber, which ought to be a vessel of equal or

nearly equal capacity to that of the copper. It is generally provided with a crane, which, with a winch, or other similar engine attached, is so contrived as to take casks either from the quay or from a lighter by the side of the quay, and convey them at once to the top of the starting-back. Over this vessel is extended a kind of railing or "gauntree," on which the casks rest, without being injured, and are easily moveable.

4. The starting-back being elevated two or three yards above the level of the ground, occasionally admits of a "fenk-back" or depository for the refuse of the blubber, immediately beneath it; which fenk-back is sometimes provided with a *clough* on the side next to the water, for "starting" the fenks into a barge or lighter placed below. In some extensive premises, however, the fenks are deposited in a large shallow cistern, or pit sunk in the earth, and made sufficiently large to contain the whole refuse of one cargo; where it remains undisturbed, until the action of the sun extracts the remaining oil, and brings it to the surface.

5. The premises likewise comprise a *shed* for the cooper, and sometimes a cooper's, or master boiler's dwelling-house; the inhabitant of which takes the charge of all the blubber, oil, whalebone, and other articles deposited around him.

6. Warehouses for containing the oil after it is drawn off into casks, are also used, not only for

preserving it in safe custody, but for defending the casks from the rays of the sun, otherwise they are apt to pine and become leaky.—And,

7. Sometimes "steeping-backs" and apparatus for preparing whalebone, are comprised within the same enclosure.

SECT. II.

Process of Boiling Blubber or Extracting Oil.

The blubber, which was originally in the state of firm fat, is found, on arrival in a warm climate, to be in a great measure resolved into oil. The casks containing the blubber, are conveyed, by the mechanical apparatus above mentioned, to the top of the starting-back, into which their contents are emptied or *started*, through the bung-holes. When the copper is properly cleansed, the contents of the starting-back, on lifting a clough at the extremity, or turning a stop-cock, fall directly into the copper, one edge of which is usually placed beneath *,

* In the premises of William Mellish, Esq. Shadwell Dock, London, which are the best adapted of any I have yet seen, the *starting-back*, which is about ten tons in capacity, has a false bottom full of small holes, placed a few inches above the true bottom: by which the oil is drained off, and passes through a grating and conducting pipe, into an adjoining copper, and is boiled by itself; while the fenks collected by the grating, are, at the same time, boiled in another copper placed equally convenient.

The copper is filled within two or three inches of the top, a little space being requisite to admit of the expansion of the oil when heated; and then a brisk fire is applied in the furnace, and continued until the oil begins to boil. This effect usually takes place in less than two hours. Many of the fritters or fenks float on the surface of the oil before it is heated, but after it is "boiled off," the whole, or nearly so, subside to the bottom. From the time the copper begins to warm, until it is boiled off or ceases to boil, its contents must be incessantly stirred by means of a pole, armed with a kind of broad blunt chisel, to prevent the fenks from adhering to the bottom or sides of the vessel. When once the contents of the copper boil, the fire in the furnace is immediately reduced, and shortly afterwards altogether withdrawn. Some persons allow the copper to boil an hour, others during two or three hours. The former practice is supposed to produce finer and paler oil, the latter a greater quantity. The same copper is usually boiled twice in every twenty-four hours, Sundays excepted. Supposing the copper to be filled at four in the morning, it is generally brought to boil by half-past five, and boiled off at half-past six or seven. It then stands to cool and subside, until about two o'clock in the afternoon, when the "bailing" process commences. One of the backs or coolers having been prepared for the reception of the oil, by putting into it a

quantity of water*, for the double purpose of preventing the heat of the oil from warping or rending the back, and for receiving any impurities which it may happen to hold in suspension, — a wooden spout, with a large square box-like head, which head is filled with brush-wood or broom, that it may act as a filter, is then placed along, from the "copper-head†" to the cooler, so as to form a communication between the two. The oil in the copper being now separated from the fenks, water, and other impurities, all of which have subsided to the bottom, is, in a great measure, run off through the pipe communicating with the cooler, and the remainder is carefully lifted in copper or tin ladles, and poured upon the broom in the spout, from whence it runs into the same cooler, or any other cooler, at the pleasure of the "boilers ‡." Besides oil and fenks, the blubber of the whale likewise affords a considerable quantity of watery liquor, produced probably from the putrescence of the blood, on the surface of which, some of the fenks, and all the greasy animal matter called *footje* or *footing*, float, and upon the top of these the oil. Great care, therefore, is requisite, on approaching these impure substances, to take the oil

* Some persons dispense with the water, believing that it promotes rancidity in the oil.

† The platform built around the edge of the copper, is called the *copper-head.*

‡ The men employed in extracting oil are thus denominated.

off by means of shallow tinned iron or copper ladles, called *skimmers*, without disturbing the refuse, and mixing it with the oil. There must always, however, be a small quantity towards the conclusion, which is a mixture of oil and footing; such is put into a cask or other suitable vessel by itself, and when the grossy part has thoroughly subsided, the most pure part is skimmed off, and becomes fine oil, and the impure is allowed to accumulate by itself in another vessel, where, in the end, it affords "brown-oil."

The refuse now left in the copper, is *bailed* into a tunnel or spout, which conveys it into the fenk-back, where it remains as long as the capacity of the vessel will admit; a portion of brown-oil, which is constantly found rising to the surface, being, in the mean time, occasionally skimmed off.

A few years ago, my Father instituted a process for reducing blubber into oil, by the use of steam; and a similar process has been adopted in Hull and other ports, and applied to the extraction of oil, with considerable advantage.

From a ton, or 252 gallons by measure, of blubber, there generally arises from 50 to 65 gallons of refuse, whereof the greater part is a watery fluid. The constant presence of this fluid, which boils at a much lower temperature than the oil, prevents the oil itself from boiling, which is, probably, an advantage, since, in the event of the oil being boiled, some of the finest and most inflammable parts would

fly off in the form of vapour; whereas, the principal part of the steam which now escapes, is produced from the water. Some persons make a practice of adding a quantity of water, amounting, perhaps, to half a ton, to the contents of each copper, with the view of weakening or attenuating the viscid impurities contained in the blubber, and thus obtaining a finer oil; others consider the quantity of watery fluid already in the blubber, as sufficient for producing every needful effect.

Each day, immediately after the copper is emptied, and while it is yet hot, the men employed in the manufacture of the oil having their feet defended by strong leathern or wooden shoes, descend into it, and scour it out with sand and water, until they restore the natural surface of the copper, wherever it is discoloured. This serves to preserve the oil from becoming high coloured *, which will always be the case, when proper cleanliness is not observed.

The starting-back being previously filled with blubber, its contents are again transferred into the copper, and the fire is applied as before. This is

* The palest-coloured oil is most esteemed by buyers, and is supposed to be the best; simply, perhaps, because it seems to have been manufactured with care, and appears to be free from any admixture of brown or black oil, produced from the fenk-back, or found in the hold of the ship.

generally accomplished by four, or half-past four o'clock in the afternoon. The copper again boils by half an hour after five or six, and is boiled off by seven or eight in the evening. The men employed in this service, consisting of about six persons, alternately watch in the night by couples. Those on watch commence about two in the morning to empty the copper, which done, they again fill it from the starting-back, which is always made ready the night before. Thus the process goes on, until the whole cargo is finished.

By means of three coolers, severally capable of containing at least twice the quantity of oil produced from one boiling of blubber in the copper, each can be allowed, in turn, to stand undisturbed upwards of twenty-four hours. Thus, while one is in the act of being filled, another stands to cool and settle, and the third is drawn off. If the backs be twice this size, or four times the capacity of the copper, every one will require two days to be filled by one copper, and after being filled, may subside during two or three days undisturbed. Even two backs in number, of this capacity, would admit of an interval of twenty-four hours each, after being filled, before it would be necessary to begin to empty it.

Thus prepared and cooled, the oil is in a marketable state, and requires only to be transferred from the coolers into casks for the convenience of conveyance to any part of the country. Each of the cool-

ers, it has been observed, is furnished with a stop-cock, beneath which there is a platform adapted for receiving the casks; where they are filled with great ease, by the introduction of a leathern tube, extending from the orifice of the stop-cock into the bung-hole. At the conclusion of the process of boiling each vessel's cargo manufactured on the premises, the backs are completely emptied of their contents. To effect this, water is poured in, until the lower part of the stratum of oil rises to within a few lines of the level of the stop-cock, and permits the greatest part of the oil to escape. The quantity left, amounts, perhaps, to half an inch, or an inch in depth. To recover this oil without waste, requires a little address. A deal-board, in length a little exceeding the breadth of the cooler, is introduced at one end, a little diagonally, and placed edgeways in its contents. The ends of the board being covered with flannel, when pressed forcibly against the two opposite sides of the cooler, prevent the oil from circulating past. The board is then advanced slowly forward towards the part of the back, where the stop-cock is placed; and in its progress (the ends being kept close to the sides of the cooler, and the upper edge a little above the surface of the oil,) all the oil is collected by the board, while the water has a free circulation beneath it. When the oil accumulates to the depth of the board, its further motion is suspended, until the oil thus collected is drawn off.

Another similar board is afterwards introduced at the farthest extremity of the cooler, and passed forward in the same manner, whereby the little oil which escapes the first is collected. Now the remnant, which still refuses to run off by the orifice of the stop-cock, being collected in a corner, is taken up by *skimmers;* and the footing or sediment which appears at the last, is disposed of in the same way as the footing from the copper, until the oil it contains rises to the surface and can be removed.

In most of the out-ports, the oil is generally deposited in casks, in which it remains until it is disposed of by the importers. In London, however, and in some concerns in Hull and other ports, the speculators in the whale-fishery are provided with cisterns or tanks, wherein they can deposite their oil, and preserve it until a convenient time for selling, without being subject to the waste which usually takes place when it is put into casks. From these cisterns, any quantity can be drawn off at pleasure.

The smell of oil, during its extraction, is undoubtedly disagreeable; but perhaps not more so than the vapour arising from any other animal substance submitted to the action of heat when in a putrid state. The prevailing opinion, however, that a whale-ship must always give out the same unpleasant smell is quite erroneous. The fact is, that the fat of the whale, in its fresh state, has no

offensive flavour whatever, and never becomes disagreeable until it is brought into a warm climate and becomes putrid; neither is a whale-ship more unpleasant than any other trader, until after her cargo is opened on her arrival in port.

SECT. III.

Description of Whale-Oil, and Remarks on the Cause of its offensive Smell.

WHALE-OIL prepared by the method just described, is of a pale honey-yellow colour; but sometimes, when the blubber from which it is procured happens to be of the red kind, the oil appears of a reddish-brown colour. When first extracted, it is commonly thick, but after standing some time, a mucilaginous substance subsides, and it becomes tolerably limpid and transparent. Its smell is somewhat offensive, especially when it is long kept. It consists of oil, properly so called, a small portion of spermaceti, and a little gelatin. At the temperature of 40°, the latter substances become partially concrete, and make the oil obscure, and at the temperature of 32°, render it thick with flaky crystals. It is sold by the ton of 252 gallons, wine-measure. Its specific gravity, is 0.9214. A gallon of oil, by measure, weighs 7 lb. 10 oz. 12½ dr. avoirdupois, at

the temperature of 60°; consequently the ton will weigh 1933 lb. 12 oz. 14 dr., or 17 cwt. 1 qr. 1 lb. 12 oz. 14 dr. *

The value of whale-oil, like that of every other similar article, is subject to continual variations. In the year 1742, oil sold in England for 18*l.* 13*s.* *per* ton; in 1743, for 14*l.* 8*s.*; in 1744, for 10*l.* 1*s.*; in 1754, for 29*l.*; in 1801, for 50*l.*; in 1807, for 21*l.*; and in 1813, when the price was

* It is remarkable, that 7½ pounds of whale oil should have been generally admitted by the dealers in this article, as an equivalent for a gallon by measure, when the real equivalent is greater by 2 oz. 12.5 drams. The buyers have indeed generally, of late, objected to the purchase of oil by weight, because they have found it deficient of the London gauge; which deficiency the sellers have been in the habit of attributing to the inaccuracy of the process; but the true cause has not, that I know of, been before explained. The error of 2 oz. 12.5 drams *per* gallon, makes a deficiency of 5.¾ gallons in the ton, at the temperature of 60°, and at lower temperatures, a deficiency still greater. As the practice of selling oil by *weight* is perfectly fair, under all circumstances of temperature, or form of the containing vessels; whereas the quantity by *measure* varies with every change of temperature, and is liable to error from the inaccuracies of the process of guaging,—it would be more satisfactory for persons concerned in the oil trade, to adopt the method of weighing. For the advancement of such a measure, some farther remarks on this subject, and the result of some experiments for ascertaining the expansion of oil by heat, are included in the Appendix to this Volume, N° VII.

the highest ever obtained, for 55*l.* or 60*l.* *per* ton *.

The application of the gas produced by the distillation of coal for lighting the public streets and buildings, manufactories, shops, &c. which formerly were lighted with oil, it was apprehended would be ruinous to the whale-fishery trade, and certainly had a very threatening appearance; but hitherto, owing, perhaps, to the amount of whale-oil lately imported, having been less than the ordinary quantity, this expected effect of the employment of gas lights has not been felt.

When blubber is boiled in Greenland, the oil produced from it is much brighter, paler, more limpid, and more inflammable, than that extracted in Britain. It is also totally free from any unpleasant flavour, and burns without smell. Hence it is evident, that whatever is disagreeable in the effluvia of whale-oil, arises from an admixture of putrescent substances. These consist of blood and animal fibre. This latter is the reticulated and cellular fibre of the blubber, wherein the oil is confined, which produces the fenks when boiled. When pu-

* The average price of whale oil during the last nineteen years, was about 34*l.* 15*s.* viz.

In	*l.*	In	*l.*	In	*l.*	In	*l.*	In	*l.*
1800,	35	1804,	31	1808,	27	1812,	35	1816,	28
1801,	46	1805,	30	1809,	36	1813,	50	1817,	46
1802,	31	1806,	29	1810,	38	1814,	32	1818,	38
1803,	38	1807,	21	1811,	31	1815,	38		

trefaction commences, a small portion of the blood contained in the blubber is probably combined with the oil, and the animal fibre, in considerable quantity, is dissolved in it. These substances not only occasion the unpleasant smell common to whale-oil, but by being deposited on the wick of lamps in burning, produce upon it a kind of cinder, which, if not occasionally removed, causes a great diminution in the quantity of light. A sample of oil which I extracted in Greenland about ten years ago, is still fine, and totally free from rancidity. It has certainly acquired a smell, but it is not more unpleasant than that of old Florence oil. Hence, were whale-oil extracted in Greenland, before the putrefying process commences, or were any method devised of freeing it from the impurities which combine with it in consequence of this process, it would become not only more valuable for common purposes, but would be applicable to almost every use to which spermaceti-oil is adapted. In fact it would become a similar kind of article.

In the first age of the fishery, all the blubber taken, used to be reduced in Spitzbergen or Jan Mayen, and imported in the form of oil only. This shows that the process can be accomplished in the cold climate of Greenland; but in the present state of things, the site of the fishery being removed to a great distance from the land, whereas formerly it was carried on in the very bays, there is not suffi-

cient time in one season for performing this operation on shore. My Father has made several attempts to accomplish it on ship-board, but the tenacious confinement of the oil by the fibre of the blubber, rendered every attempt to extract the whole contents unavailing. After the process was finished, he always found that the fenks still held a considerable proportion of the oil, amounting to perhaps one-third of the original quantity, which he could hit on no effectual method of extracting. He tried a hydrostatic press and other machines for squeezing it out, but these likewise failed of producing the wished effect. The idea was therefore abandoned, particularly as the increase in value of the oil thus obtained was not sufficient to compensate for the quantity which was lost. It therefore appears, that the putrefying process serves to relax the tenacity of the cellular substance of the blubber, and permits nearly the whole oil to ooze out, and is therefore serviceable to the manufacturer, though injurious to the quality of the oil.

Between the adipose and muscular substances surrounding the body of the whale, is interposed a kind of loose spongy fat, or in some places fat intermixed with muscular flesh. This substance, before alluded to under the name of *kreng*, affords so little oil in the usual way, that it is frequently thrown overboard. But on the application of the boiling apparatus to it in Greenland, my Father

succeeded in obtaining a ton or two of oil in the course of one season; a product which, though it paid near about the expence of the apparatus, was attended with such trouble and inconvenience, that he never afterwards repeated the operation.

In performing some experiments on oil in Greenland, during the fishing season of 1818, I adopted a process for refining oil extracted from blubber, before the putrifying process commenced, by which I procured a remarkably fine oil. It was nearly colourless, beautifully transparent, and very limpid. Its specific gravity, temperature 60°, (compared with snow water of the same temperature,) was 0.9202, and the gross oil from whence it was separated 0.922. This oil retains its fluidity, and even its transparency, at a very low temperature. A fine specimen of seal oil, refined in the same way, remained unchanged in appearance, at the temperature of 15°, when common whale, seal, sperm, and other oils, were as thick as hog's lard, and had quite lost their pellucidness. The oil refined by this process, is more inflammable than spermaceti-oil,—and so pure, that it will burn longer, without forming a crust on the wick of the lamp, than spermaceti oil, or any other oil with which it has yet been compared.

Besides the oil produced from blubber by boiling, the whalers distinguish such as oozes from the jaw-bones of the fish, by the name of *jaw-bone oil;*

and inferior oils, which are discoloured, and more impure, by the denominations of *brown oil*, and *black oil* or *bilge oil*. Brown oil is produced in the way described in the process of boiling; black or bilge oil is that which leaks out of the casks in the course of the voyage, or runs out of any blubber which may happen to be in bulk, and accumulates in the bottom of the ship. This oil is always very dark coloured, viscous, and possessed of little transparency. In the hold of the ship, it imbibes various impurities; and when strongly acted upon by the hydrogenous gases of the bilge-water, is sometimes so changed in its qualities, that it combines to a certain extent with the salt-water on which it floats, and is rendered totally useless. When, however, its oleaginous properties continue unchanged, it is preserved and sold for inferior uses, at a proportionate reduction of price.

From what has been advanced, we see why the palest oil is esteemed the most valuable. Pale limpid oil has a chance to be the most pure, because any inferior oil mixed with it, or much animal matter combined with it, always has a tendency to heighten the colour and render it viscous.

As oil kept in open vessels, we are informed, becomes gradually more and more oxygenated, and also less fluid, it is necessary to keep whale-oil closely barrelled up. Another precaution for pre-

serving it uninjured, is to keep it at such a temperature that it shall not freeze; as it is probable that the resinous part only concretes with cold, and that a gas is disengaged, which consists of some of its most volatile parts, and materially injures its property of burning *. At least, oil which has been kept over a winter or two, is supposed to be scarcely capable of burning; though I suspect the prejudice against old oil, unless it has been very ill kept, is much greater than the actual deterioration of the article can warrant.

Whale-oil is said to be rendered more fluid, as well as more combustible, by the addition of cold drawn linseed oil †.

SECT. IV.

Description of Whale-bone, and of the Method of Preparing it.

WHALE-BONE, or whale-fins, as the substance is sometimes, though incorrectly named, is found in the mouth of the common Greenland whale, to which it serves as a substitute for teeth. It forms an apparatus most admirably adapted as a filter for separating the minute animals, on which the whale feeds, from the sea-water in which they exist.

* Nicholson's Journal, vol. ii. p. 46. † Idem.

It is a substance of a horny appearance and consistence, extremely flexible and elastic, generally of a bluish black colour, but not unfrequently striped longitudinally with white, and exhibiting a beautiful play of colour on the surface. Internally it is of a fibrous texture, resembling hair; and the external surface consists of a smooth enamel, capable of receiving a good polish.

This substance, when taken from the whale, consists of laminæ, connected by what is called the *gum* in a parallel series, and ranged along each side of the mouth of the animal. The laminæ are about 300 in number, in each side of the head. The length of the longest blade, which occurs near the middle of the series, is the criterion fixed on by the fishers for designating the size of the fish. Its greatest length is about 15 feet; but an instance very rarely occurs of any being met with above $12\frac{1}{2}$ or 13 feet. Its greatest breadth, which is at the root end, is 10 or 12 inches, and its greatest thickness $\frac{4}{10}$ or $\frac{5}{10}$ of an inch.

The two *sides* or series of the whale-bone, are connected at the upper part of the head, or crown-bone of the fish, within a few inches of each other, from whence they hang downward, diverging so far as to enclose the tongue between their extremities; the position of the blades with regard to each other, resembles a frame of saws in a saw mill; and, taken altogether, they exhibit, in some mea-

sure, the form and position of the roof of a house. The smaller extremity and interior edge of each blade of bone, or the edge annexed to the tongue, are covered with a long fringe of hair, consisting of a similar kind of substance as that constituting the interior of the bone.

Whalebone is generally brought from Greenland in the same state as when taken from the fish, after being divided into portable *junks*, or pieces, comprising 10 or 12 laminæ in each; but occasionally it is subdivided into separate blades, and the gum and hair removed when at sea.

One of the first importations of whalebone into England, was probably in the year 1594, when a quantity of this substance, being part of the cargo of a wrecked Biscayan ship, was picked up at Cape Breton, by some English ships fitted out for the whale and morse fisheries, after the example of the Icelanders and Biscayans *.

This substance has been held in such high estimation, that, since the establishment of the Spitzbergen whale-fishery, the British have occasionally purchased it of the Dutch, at the rate of 700 *l. per* ton †. It is calculated, that at least 100,000 *l. per annum* were paid to the Dutch for this article,

* Hakluyt's Voyages, vol. iii. p. 194.

† Macpherson's Annals of Commerce, vol. iii. p. 512.

about the years 1715 to 1721, when the price was 400 *l.* * About the year 1763, the price in England was 500 *l. per* ton; but, after an extensive importation of this article from New England, the price declined to 350 *l.* † and subsequently as low as 50 *l. per* ton. Of late years, the price has usually been fluctuating between 50 *l.* and 150 *l. per* ton. Whalebone becomes more valuable as it increases in length and thickness.

On or near the premisses where the oil is extracted, the whalebone is commonly cleaned and prepared.

The first operation, if not already done, consists in depriving it of the gum. It is then put into a cistern containing water, until the dirt upon its surface becomes soft. When this effect is sufficiently produced, it is taken out, piece by piece, laid on a plank placed on the ground, where the operator stands, and scrubbed or scoured with sand and water, by means of a broom or a piece of cloth. It is then passed to another person, who, on a plank or bench, elevated to a convenient height, scrapes the root-end where the gum was attached, until he produces a smooth surface; he or another workman, then applies a knife or a pair of

* Elking's View of the Greenland Trade, &c. p. 65.

† Macpherson's Annals, vol. iii. p. 371.

shears to the edge, and completely detaches all the fringe of hair connected with it. Another person, who is generally the superintendant of the concern, afterwards receives it, washes it in a vessel of clean water, and removes with a bit of wood, the impurities out of the cavity of the root. Thus cleansed, it is exposed to the air and sun until thoroughly dry, when it is removed into a warehouse, or other place of safety and shelter.

Before it is offered for sale, it is usually scrubbed with brushes and hair-cloth, by which the surface receives a polish, and all dirt or dust adhering to it is removed; and, finally, it is packed in portable bundles, consisting of about a hundred weight each. The *size*-bone, or such pieces as measure six feet or upward in length, is kept separate from the *under-size*; the latter being usually sold at half the price of the former. Each blade being terminated with a quantity of hair, there is sometimes a difficulty in deciding, whether some blades of whalebone are size or not. Owing to the diminished value of under-size bone, and more particularly, in consequence of the captain and some of the officers engaged in a fishing ship, having a premium on every size fish, it becomes a matter of some importance in a doubtful case, to decide this point. From a decision, which I understand has been made in a court of law, it is now a generally received rule, that so much of the substance terminating each blade, as gives rise

to two or more hairs, is whalebone; though, in fact, the hair itself is actually the same substance as that of which the whalebone is composed.

SECT. V.

Remarks on the Uses to which the Oil, Fenks, Tails, Jaw-bones, Whalebone, and other produce of Whales, are applicable.

1. *Oil.*—The oil produced from the blubber of the whale, in its most common state of preparation, is used for a variety of purposes. It is largely used in the lighting of the streets of towns, and the interior of places of worship, houses, shops, manufactories, &c.; it is extensively employed in the manufacture of soft soap, as well as in the preparing of leather and coarse woollen cloths; it is applicable in the manufacture of coarse varnishes and paints; in which, when duly prepared, it affords a strength of body more capable of resisting the weather, than paint mixed in the usual way with vegetable oil*;

* Mr Thomas Vanderham of London, communicated to the Society for the Encouragement of Arts, Manufactures and Commerce, "An account of processes for preparing cheap and durable paints with fish-oil;" for which communication, the Society voted him the Silver Medal, and a premium of Twenty Guineas. (See Repertory of Arts, vol. x. 2d series, p. 116.)

it is also extensively used for reducing friction in various kinds of machinery; combined with tar, it is much employed in ship-work and in the manufacture of cordage; and either simple or in a state of combination, it is applied to many other useful purposes.

One of the most extensive applications of whale oil, that for illumination, has recently suffered a considerable diminution, in consequence of the appropriation of gas from coal to the same purpose. This discovery, brilliant as it is acknowledged to be, which, in its first application, bore such a threatening aspect against the usual consumption of oil, may soon, it is probable, be the means of bringing the oil of the whale into more extensive use than it has at any former period been. Whale-oil of the most inferior qualities is found to afford a gas, which, in point of brilliancy, freeness from smell, ease of manufacture, &c., is found to be greatly superior to that produced from coal. Some remarks on the properties of this gas, and the mode in which it is produced, may be proper in this place; and that I may be acquitted of giving a too favourable character of oil-gas, I shall follow some accounts that have been published in the "Quarterly Journal of Literature, Science and the Arts."

The process for the formation of gas from oil, is simple, and the apparatus compact and not expensive.

One or more retorts being provided and brought to a moderate red heat, oil, contained in an air-tight

vessel, is allowed to flow into them, which is principally decomposed in its passage through, and converted into gas suitable for illumination. The flow of the oil into the retorts, and the production of gas, can be regulated to a convenient rate. Some oil, however, it will generally be found, passes over, in a state of vapour without suffering decomposition, which, if allowed to escape by the burner, may occasion an unpleasant smell. To prevent this, the gas is made to pass through a worm in a vessel of water, by which the steam is condensed into oil, runs at once into the oil cistern, and is again exposed to decomposition in the retorts. Lest there should still be any oil suspended in the gas in a state of vapour, a further precaution for purifying it is taken, by conveying it into another vessel, where it is further cooled and washed, by passing in a zig-zag direction through water, and rendered fit for use*.

The patent apparatus for the production of gas from oil, is made by Messrs Taylors and Martineau, the patentees, of various sizes and powers, to suit dwelling houses and other buildings, in which room is an object of importance.

"One which is capable of furnishing gas for from twelve to twenty argand lamps, may be convenient-

* Quarterly Journal of Literature, &c. vol. viii. p. 121.—When a certain quantity of gas has been produced, it is found that the retorts begin to lose their power of decomposing oil; but, by throwing bits of common brick into the retorts along with the oil, their capability of producing gas is not only restored but augmented.

ly placed in such a fire-place as is usually found in back kitchens, and will occupy a space only of about three feet square, or more conveniently of four feet by three, and will require a height of about eight feet*." A large apparatus now in use at Apothecaries Hall, measures ten feet in breadth, six feet in depth, and about eight feet in height.

The gasometer for private houses, should scarcely be of less capacity than 80 to 100 cubic feet; and for mansions and larger establishments, 300 to 600 cubic feet. The former will only require a gasometer of about four feet wide, four feet high, and five or six feet long†.

The only particular attention requisite with the patent apparatus, seems to be the cleaning out of the retorts, which, from the accumulation of carbonaceous matter, becomes necessary from time to time, and the keeping up of a *moderate* fire when the apparatus is in use‡.

This carbon is the only residuum in the retort, and the only products of the oil "besides the gas, are a minute quantity of sebacic and acetic acids, and a portion of water," all of which are separated by passing the gas through water §.

The advantages of oil-gas, when contrasted with

* Journal of Literature, &c. vol. viii. p. 122.

† Idem, p. 123. ‡ Idem, p. 121.

§ Idem, vol. vii. p. 316.

that obtained from coal, are as follow: "The material from which it is produced, containing no sulphur or other matter by which the gas is contaminated, there are no objections to its use on account of the suffocating smell in close rooms. It does no sort of injury to furniture, books, plate, pictures, paint, &c." all of which are liable to be damaged by coal-gas. "All the costly and offensive operation of purifying the gas by lime, &c., is totally avoided when it is obtained from oil. Nothing is contained in oil-gas, which can possibly injure the metal of which the conveyance pipes are made*."

* Quarterly Journal, vol. vii. p. 315.—It is also mentioned in this publication (p. 312.), in reference to the defects and inconvenience of coal-gas, that coals contain a large proportion of sulphur, which is volatilised with the gas; and it has hitherto been found impossible to purify it sufficiently for lighting close rooms. The suffocating smell, and the property it has of tarnishing every thing metallic, exclude its use from dwelling-houses, on account of the injury it would do to our health, our furniture, books, pictures, plate, paint, &c. Besides (p. 313.) "the apparatus necessary for the production of coal-gas is very large, expensive, and unmanageable; the purification, imperfect as it is, very troublesome; and the residual matter is peculiarly offensive. This confines its adoption to public companies or large establishments, thereby materially limiting its utility, and producing an injurious monopoly. And the employment of coal instead of oil, for the purpose of illumination, has an injurious effect on one of the most important branches of trade a maritime country can possess; and in proportion as coal-gas is used, our fisheries are injured."

"The oil-gas containing no unmixed hydrogen, (which occasions the great heat of coal-gas,) there is no greater heat in proportion from the flame of oil-gas, than from burning oil in lamps, wax-candles," &c.

"The apparatus for the production of oil-gas, is much less expensive than that necessary to make coal-gas; it occupies much less space,—it requires much less labour and skill to manage it,—it is not so liable to wear and tear, and not so costly to repair as a coal-gas apparatus. There are no offensive products to remove; and on its present improved construction, it may be introduced into any dwelling-house without nuisance*."

"The oil-gas has a material advantage over coal-gas, from its peculiar richness in olefiant gas, which renders so small a volume necessary, that one cube foot of oil-gas will be found to go as far as four (two?) of coal-gas†." Because, as oil-gas requires more oxygen for its consumption than coal, a less quantity of the former is consumed in a flame of equal size, while the brilliancy of the light is superior ‡. This circumstance produces a great saving of room and of expence.

"The superiority of the light from oil-gas over other artificial lights, is fully shown by its rendering the delicate shades of yellow and green nearly as distinct as when viewed by solar light §."

* Quarterly Journal, vol. vii. p. 314.

† Idem, p. 315.

‡ Idem, No. xi.

§ Idem, p. 316.

The economy of oil-gas for purposes of illumination, may be judged of from the following data :—

" One gallon of common whale-oil will produce about 90 cube feet of gas *, and an argand burner will require a cube foot and a-half *per* hour to maintain a perfect light; consequently, a gallon of oil, made into gas, will afford such a light for sixty hours; and the expence, at a moderate price of oil, will be, allowing for coals, labour, &c. not more for one burner than three farthings *per* hour.

" Such a burner will be equal, in intensity of light, to two argand oil lamps, or to ten mould candles.

" The expence of argand oil lamps is usually admitted to be about 1½*d.* *per* hour each.

" Suppose 10 mould candles to be burning, (at 4 to the lb. will be 2½ lb. costing 2*s.* 11*d.*), one-tenth part will be consumed in each hour, and the cost of the light is then 3½*d.* *per* hour †."

With wax-candles, reckoned at 4*s.* 6*d.* *per* lb. the same quantity of light *per* hour would cost 14*d.*

The following will therefore be the result :—

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* " Mr De Ville, of the Strand, who has made many important experiments and observations on gas illumination, with a view of applying it to light houses, is inclined to estimate the average produce in gas of a gallon of oil, at 80 cubical feet."—(Quarterly Journal, vol. vii. p. 316.)

† Quarterly Journal, vol. vii. p. 314.

" Argand burner, oil-gas *per* hour,.....0¾*d.*
Argand lamps, spermaceti oil,.....3
Mould candles,.....3½
Wax candles,.....14" *

When a quantity of light smaller than that given out by ten candles is only wanted, the cost will be proportionally less; and as the gas improves by keeping, whatever remains over from day to day will be an advantage to the consumer.

Besides, the above estimation of the cost of oil-gas "is taken on the usual price of good whale-oil;" whereas, oil of the most inferior kinds, such as brown oil, bilge or black oil, and even the greasy substance called footje or footing, are applicable to the manufacture of gas, in the use of which the cost may be reduced to less than one-half.

The first application of oil to the formation of gas, has been attributed to Messrs John and Philip Taylor, who, "about two years since," (that is, two years prior to the month of July 1819,) conceived "that it might be practicable to construct an apparatus capable of converting oil into gas, which would be preferable to coal-gas for lighting houses †." In their attempts for accomplishing this important design, they have been highly successful; so successful, indeed, that it is apprehended that when the

* Quarterly Journal, vol. vii. p. 315.
† Idem for July 1819, p. 313.

apparatus they have contrived has become generally known, it will command the attention of the public, and be brought into extensive application. It is, however, but justice to a gentleman of Hull, Mr J. B. Emmett, to mention, that experiments were instituted by him so early as August 1816, in which, I understand, he succeeded in procuring a gas, very superior to that from coal, by decomposing whale-oil; and that in April 1817, the substance of his investigation of this property of oil, was published in the "Philosophical Magazine," and also appeared in April and May, in several of the Yorkshire newspapers.

To persons who are concerned in the whale-fisheries, as well as those who consider every thing of importance which involves our national prosperity, it must be gratifying to observe the laudable example which has been set by the inhabitants of Norwich, Ipswich, &c. of giving encouragement to the fisheries by lighting their streets with gas from oil. In places where coal is not very cheap, gas, it seems, can be produced from oil, at about the same expence as coal-gas; consequently, the numerous advantages of the former, will render it highly preferable.

A recent contrivance, tending to encourage the manufacture and increase the consumption of oil-gas, I have great pleasure in mentioning. I allude to the patent *Portable Gas Lamp*, invented by David Gordon, Esq. of Edinburgh. This consists of a

strong apparatus of copper or brass, of a spherical urn-like, or any ornamental or convenient form, in which gas may be compressed by a forcing pump, or other apparatus, and consumed in burners attached to it, with the same facility and security as an ordinary lamp.

For regulating the escape of the condensed gas, Mr Gordon has adopted two ingenious contrivances, one by a conical leather valve, and the other by an improvement in the common stop-cock; either of which admits of such minute regulation, that a flame of any degree of intensity, from a light that is scarcely perceptible, to the full brilliancy of which the gas is capable, may be produced at pleasure, and varied with the greatest facility.

A particular account of this interesting invention, with an illustrative plate, may be seen in the valuable Journal recently commenced in Edinburgh *. "There is one application of the portable gas lamp," say the editors of this work, "to which we attach a very high value. By an extreme diminution of the aperture, the flame can be rendered so small (in which case it is reduced to a blue colour) as to give no perceptible light, and to occasion almost no consumption of gas. In this state, the lamp may be used in bed-rooms, and the imperceptible flame may at any time be expanded into the most brilliant

* *Edinburgh Philosophical Journal.*—See vol. i. p. 373.

light, by turning the cock, by means of a metallic rod terminating near the bed."

One of these lamps, not larger than a common tea-urn, when filled with oil-gas, condensed 25 times, will afford a flame equal to 5 candles, 6 to the pound, for about 12 hours. A sphere of 12 inches diameter, filled in the same way, will, with two argand burners, equal to 12 candles, burn for upwards of 6 hours with coal-gas, and 12 hours with oil-gas. A cylinder, 6 inches in diameter, and 2 feet high, exclusive of the hemispherical ends, is calculated to supply an argand burner, equal to 10 candles, for 6 hours, with coal-gas, and 12 hours with oil-gas *.

For facilitating the process of filling these lamps, a reservoir, connected with a gas-work, may be kept constantly charged with condensed gas; so that a sufficient portion of its contents could be transferred to the portable lamp, with the same ease and dispatch as filling it with oil.

Whale-oil, when freed from the incombustible and contaminating animal matters, which are usually dissolved in it, in consequence of putrefaction, is then applicable to a variety of purposes, in which the common oil cannot conveniently be employed. The following is a list of some of the processes for refining whale-oil :—

* *Edinburgh Philosophical Journal.*—See vol. i. p. 376.

1. An account of processes for edulcorating train oil, by Mr Dossie, was read before the Society for the Encouragement of Arts, Sciences, and Commerce, July 15. 1761 *.
2. Two processes for purifying rape-oil, applicable also to train-oil, have been published in the "Cours complet d'Agriculture," (tom. xii), by M. Curaudeau †.
3. A patent was granted to Mr Joshua Collier of Southwark, broker, dated 13th December 1798, "for a chemical process for freeing fish oils from their impurities, in point of smell, taste, and colour; and for improved strainers for oils and other liquids; with other instruments for ascertaining their qualities, and assisting their burning ‡."
4. A patent, bearing date December 13. 1806, was granted to William Speer, Esq. of Westminster, (late of Dublin), for a new method "of purifying, refining, and otherwise improving fish oils, and other oils, and converting and applying to use the unrefined parts thereof §."
5. A patent for "a method of sweetening, purifying, and refining Greenland whale and seal oil," was granted to Mr Henry William Vanderkleft of London, dated 26th July 1814 ||.

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* See Gent. Mag. for 1761, p. 495.

† See Nicholson's Journal, vol. xiii. p. 150.

‡ "Repertory of Arts," vol. x. p. 389.

§ Idem, (2d series,) vol. xii. p. 174.

|| Idem, (2d series,) vol. xxv. p. 270.

6. "A method of extracting all the gross or mucilaginous matter from fenks or Greenland blubber, produced from whales, when boiled into oil; which method not only renders the oil so boiled, more free from its usual rancid smell and taste, but in a great degree adds to its burning and inflammable qualities," was invented by Mr William Allamus Day, of London, for which a patent was granted, bearing date December 20. 1814 *.

7. Mr Edward Roche invented a simple method of rendering rape-oil equal to spermaceti oil, for the purposes of illumination; which invention, probably, might have a similar effect upon common whale or seal oil †.

8. A process for refining whale oil, by agitation in a mixture of tannin and water is employed by Mr Speer of Bowling Street, Westminster, and with such effect, that the most rancid oil, after being submitted to the process, becomes so pure that it may be burnt in houses ‡.

Whale-oil, in its unrefined state, frequently obtains an unmerited bad character for burning,

* Repert. of Arts, (2d series,) vol. xxvi. p. 90.

† Idem, vol. xxx. p. 95.

‡ The only notice I have seen of this invention, occurs in Parkes' "Chemical Essays," vol. i. p. 57.

when the fault lies in those who have the charge of the lamps in which it is consumed. Want of proper cleanliness is a very common fault, and one which is most inimical to the obtaining of a good light. It is a practice not uncommon with those who use oil lamps, especially in kitchens, to fill the lamp up, night after night, without removing the residue, and cleaning it out, by which all the impurities mechanically mixed in the oil are progressively deposited and concentrated, until the cavity of the lamp becomes almost filled with a gross substance, of the consistence of common paint. Pure oil, of the quality of some that I have myself prepared, would no doubt continue to burn with a proper effect, though the lamp were not cleaned out for a month together, provided care were taken to prevent the access of dust; but, in the use of the best oil of commerce, the lamps ought to be emptied, and carefully cleaned out, at least once or twice a-week. A common error, also, in the trimming of lamps, consists in furnishing them with wicks of too great diameter. The wicks should be so thick as to prevent them from slipping down the tubes in which they are supported; but they should by no means fill the tubes, otherwise the course of the oil is interrupted, and an inadequate supply afforded for producing the requisite flame. It is a precaution which ought not to be neglected, to dry the wick by a fire, before it is used.

2. *Fenks.*—The fenks, or ultimate refuse of the blubber of the whale, form an excellent manure, especially in soils deficient in animal matter. The late eminent judge, Lord Meadowbank, found this sort of refuse the very best matter to be added to peat moss, in order to bring it into complete fermentation, and to produce the rich manure known to agriculturists by the name of "Meadowbank compost."

Fenks might likewise be used, it is probable, in the manufacture of prussian blue, and also for the production of ammonia.

Footing, which is the finer detached fragments of the fenks, not wholly deprived of oil, may be used as a cheap material, in the formation of gas for illumination.

3. *Whale's Tail*, consisting chiefly of tendinous fibres, is capable of being converted into glue, and is extensively used in the manufacture of this article, especially in Holland. A small quantity of oil may likewise be extracted from the tail. The tail, being of a strong texture, and very tough, is used by the whale-fishers for chopping-blocks, on which the blubber of the whale is divided into pieces suitable for passing through the bung-holes of the casks.

4. The *Bones.*—The jaw-bones, with the skull or crown-bone of the whale, are the largest found in nature. They are sometimes met with of the length of 25 feet. Jaw-bones are principally used as the

ribs of sheds, and in the construction of arches and posts of gate-ways. The external part of these bones, being harder and of a more compact texture than the interior, is applied to the formation of the sheeves of blocks, in place of lignum-vitæ. Any of the bones, when ground into powder, forms a valuable ingredient in manure.

5. *Whalebone.*—This singular substance, when softened in hot water, or simply by heating it before a fire, has the property of retaining any shape which may be then given it, provided it be secured in the required form, until it becomes cold. This property, together with its great elasticity and flexibility, renders it capable of being applied to a great variety of useful purposes.

The first way in which whalebone seems to have been employed, was in the stays of ladies. Its application to this purpose, was, at one period, when the quantity imported was small, so general, that it attained, in the wholesale way, the price of 700 *l.* *per* ton. Subsequently, however, it has become less valuable, and of late it has fallen somewhat into disrepute, some ladies having superseded its use in stays, by supporting themselves with plates of steel. There has, for many years, been an extensive consumption of this article in the manufacture of umbrellas and parasols. The white enamel, (found in some specimens of whalebone), has recently been fabricated into ladies hats, and into a variety of orna-

mental forms, as head-dresses; and the black enamel, and the coarser material of which the interior is composed, have been worked into a great variety of useful articles, for which patents have been obtained. The black enamel is employed in the same way as cane, in the construction of the seats or backs of chairs, gigs, sofas, &c.; and the grosser parts in the interior of the blade, when divided into fibres, and curled, are capable of being used in the stuffing of mattresses, &c. The hair on the edge of the whalebone, answers admirably every purpose of bullock's hair in stuffings for chairs, sofas, settees, carriages, mattresses, cushions, &c. An attempt has been made to build whale-boats of this material; but the great alteration which takes place in its dimensions, in different states of the atmosphere, on account of its ready absorption of moisture, renders it inapplicable. It has been used, with a much better effect, in the construction of portmanteaus, and travelling trunks. Hygrometers, the ramrods of fowling-pieces, fishing-rods, the shafts, springs, and wheels of carriages, &c. are articles, in the formation of which, whalebone has already been employed.

The following is a list of some patents which have been taken out for the peculiar appropriation of this substance.

1. Mr Bowman, of Leith, obtained a patent, bearing date 30th of October 1807, for the adapta-

tion of whalebone to the manufacture of "hats, caps, and bonnets for men and women; harps for harping or cleansing corn or grain; and also the bottoms of sieves and riddles; and girths for horses; and also cloth for webbing, fit for making into hats, caps, &c.; and for the backs and seats of chairs, sofas, gigs, and other similar carriages and things; and for the bottom of beds; and also whalebone reeds for weavers *."

2. A patent was granted to Mr Samuel Crackles, of Hull, brush-manufacturer, "for a method of making and manufacturing brushes from whalebone;" dated November 3. 1808 †.

3. Mr H. W. Vander Kleft, of London, procured a patent, bearing date August 17. 1813, for the invention of a "walking staff, calculated to contain a pistol, powder, ball, and screw telescope, pen, ink, paper, pencil, knife, and drawing utensils;" the exterior of which may be covered or veneered with prepared whalebone ‡.

4. A patent has also been granted to Mr R. Dixon, 49. High Holborn, London, for an improvement in the mode of manufacturing portmanteaus and travelling trunks, by the use of whalebone.

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* Repertory of Arts, vol. xi. (2d series,) p. 411.

† Idem, vol. xiv. (2d series,) p. 156.

‡ Idem, vol. xxvi. (2d series,) p. 88.

CHAPTER VII.

NARRATIVE OF PROCEEDINGS ON BOARD THE SHIP ESK, DURING A WHALE-FISHING VOYAGE TO THE COAST OF SPITZBERGEN, PERFORMED IN THE YEAR 1816; PARTICULARLY RELATING TO THE PRESERVATION OF THE SHIP UNDER CIRCUMSTANCES OF PECULIAR DANGER.

THE ship Esk, under my command, sailed from Whitby on the 29th of March 1816; put into Lerwick to trim the ship on the 1st of April; sailed again on the 3d, entered the frigid confines of the icy sea on the 14th, and killed our first whale on the 25th of the same month.

On the 30th of April we forced into the ice, with a favourable wind; and, after passing through a large body of it, entered an extensive sea, such as usually lies on the western coast of Spitzbergen at this season of the year, early on the morning of the following day. The wind then blowing hard from the S. S. E., we kept our reach to the eastward until three o'clock in the afternoon, when we unexpectedly met with a quantity of ice, which inter-

rupted our course. We then *ward*, by the way of avoiding it, but soon found, though the weather was thick with snow, that we were completely embayed, in a situation that was truly terrific. In the course of fourteen voyages, in which I had before visited this inhospitable country, I passed through many dangers wherein my own life, together with those of my companions, had been threatened; but the present case, where our lives seemed to be at stake for a length of time exceeding twelve hours, far surpassed in awfulness, as well as actual hazard, any thing that I had before witnessed. Dangers which occur unexpectedly, and terminate suddenly, though of the most awful description, appear like a dream, when they are passed; but horrors which have a long continuance, though they in some measure decrease in their effect on the mind, by a lengthened contemplation of them, yet they leave an impression on the memory which time itself cannot altogether efface. Such was the effect of the present scene. Whilst the wind howled through the rigging with tempestuous roar, the sea was so mountainous that the mast-heads of some accompanying ships, within the distance of a quarter of a mile, were intercepted, and rendered invisible by the swells; and our ship frequently rolled the lee-boats into the water, that were suspended with their keels above the *roughtree*-rail! At the same time, we were rapidly approaching a body of ice, the

masses of which, as hard as rocks, might be seen at one instant covered with foam, the next concealed from the sight by the waves, and instantly afterwards reared to a prodigious height above the surface of the sea! It is needless to relate the means by which we attempted to keep the ship clear of the threatened danger, because those means were without avail. At 11 P. M. we were close to the ice, when, perceiving through the mist, an opening a short distance within, we directed the drift of the ship towards it. As we approached the ice, the sails were filled, so that the first blow was received obliquely on the bow, when the velocity of the ship was moderate. In this place, the pieces of ice were fortunately of smallish dimensions; at least, all the larger masses we were enabled to avoid, so that, after receiving a number of shocks, we escaped without any particular accident into the opening, or slack part of the ice above noticed. This opening, as far as we could see, promised a safe and permanent release. But in this we were grievously disappointed: for, when we attempted to ware the ship, which soon became necessary, she refused to turn round, notwithstanding every effort, in a space which, in ordinary circumstances, would have been twice sufficient for the evolution. In consequence of this accident, which arose partly from the bad *trim* of the ship, and partly from the great violence of the wind, she fell to leeward into a close body of ice, to which we

could see no termination. The Mars of Whitby, and another vessel, which closely followed us as we penetrated the exterior of the ice, being in better trim than the Esk, performed the evolution with ease, and were in a few minutes out of sight. In this dreadful situation, we lay beating against the opposing ice, with terrible force, during eight successive hours; all which time, I was rocked, with no agreeable feeling whatever to console me, at the top-gallant-mast-head, directing the management of the sails, to avoid the largest masses of ice, any one of which would have perforated the side of the ship. By the blessing of God, we succeeded to admiration; and, at 8 A. M. of the 2d of May, gained a small opening, where we contrived to navigate the ship, until the wind had somewhat subsided, and the weather cleared, so that we had the opportunity of forcing into a more commodious place. On examining the ship, we found our only apparent damage to consist in the destruction of most of our rudder works, a few slight bruises on the sides, and a cut on the lower part of the stem of the ship. The first damage would have been very serious, had not we fortunately had a forge, with an excellent smith, on board, whereby this important piece of machinery, the rudder, was so secured, as to serve for every common occasion.

From this time, to the 20th of May, the fishery was generally interrupted by the formation of new

ice; insomuch, that, during this interval, we killed but one whale, while few of our neighbours succeeded so well.

On the 19th of May, we penetrated the ice to the utmost extent of any opening, where, in the latitude of 79½ degrees, we met with several small whales, sporting and feeding about the edges of some extensive fields of ice. In four days, we killed five small "fish." The wind prevailing then from the S. S. E. to S. W., continuing in that direction, and occasionally blowing hard, forced a swell into the ice, which, though totally imperceptible to the sight, broke the fields and floes to pieces, and brought the fragments so closely together, that our ship, along with the Mars, and three others, were soon immovably fixed. During the succeeding week, we never moved, excepting occasionally a few yards, which we effected with vast labour, to avoid the terrible crushes of the ice that were apparent all round us, and which, in one instance, lifted the North Britain six feet above her usual water-mark. The next twelve days were spent in the most arduous labour, in warping the ship through occasional openings of the ice. On several occasions we had recourse to sawing; and, in some cases, we wrought for many hours with our whole force and ingenuity, without being able to move an inch. At length, on the 12th of June, we happily escaped, though our companions were all left behind. They, however,

having particularly favourable winds and weather, were not long detained. We immediately struck and killed our eighth fish.

On the 14th we parted company with the Mars, and proceeded alone to the southward; when, after a chace of several hours, we captured a large whale. On the 20th we killed another. In the course of the week, between the 17th and 24th, three large whales, which would have afforded a fourth part of a cargo, escaped us, by the unparalleled unskilfulness of our harpooners.

We now penetrated the *drift-ice* in the latitude of 78°, to the distance of seventy miles from the exterior, where we met with several whales. One was struck and captured, and a second was shot by means of the harpoon-gun; but owing to the want of prompt assistance, the latter was lost. On the following day, (27th of June,) another large fish fell beneath our lances; which, with a sucking fish we got on the 25th, made our number thirteen, and our quantity of oil about 125 tons. This was a larger cargo than any ship had procured that we had yet met with, excepting only one. On the 28th, the John of Greenock, commanded by my brother-in-law, Mr Jackson, joined us.

After proceeding to the westward the greater part of the 28th, we arrived at the borders of a compact body of field-ice, consisting of immense sheets of prodigious thickness. Here a number of ships were

already assembled, some of which had made a very profitable fishery on the day preceding our arrival. Our latitude was at this time 78° 8′ N., and longitude 2° 10′ W.

As the whales had quitted this position, and as I considered the situation not particularly desirable, notwithstanding extensive spaces lay between the different sheets of ice, the ship was allowed to drift to the eastward all the night. The wind, however, subsiding to a calm, in the morning of the 29th of June, I found the ship was very little removed from the place where she lay when I went to bed. I soon perceived that the floes had approached each other very considerably, and that they were still in the act of closing. Fearful of being again *beset*, and particularly in a situation where the ice was so heavy, and at such a great distance from the sea, we lowered four boats to tow the ship through an opening at a short distance from us. At the very moment when we were about to enter it, it closed. The John had just passed through it. Another channel, of at least a mile in width, and scarcely that distance from us, lying to the southward, we immediately directed the ship towards it. Finding as we advanced, that the northern floe was not only setting towards the southern one, but was, at the same time, revolving with a velocity nearly equal to that of the ship, I was induced to lower all the boats for the purpose of accelerating our progress.

The effect was then considerable; assisted by a light air of wind, the ship attained the velocity of about three miles *per* hour, while the northern floe had a velocity of about two. As the channel between the two floes was constantly as broad as our distance from the narrowest part, we were tempted to advance. But when we came within a hundred yards, our progress became sensibly lessened by a light air of wind, that at this moment unfortunately sprung up a-head; as such, I began to look out for a place of refuge, and succeeded in discovering a deep indentation in the southern floe, which appeared calculated to afford a secure retreat. Conceiving, however, that we should be still more secure were we to return, we attempted to stop the ship before she entered between the two first points; but owing to a mistake in taking out a rope that was found to be entangled, by which a considerable loss of time was sustained, the ship advanced so far that she had passed the points, and could not be hauled back without a risk of being arrested by the ice at the projection, and crushed to pieces. I, therefore, ordered the boats again to tow forward; and they had already got the ship into the safety of the indentation, within ten yards, when a small piece of ice coming athwart her bow, stopped her progress, and she was in a minute afterwards subjected to a considerable squeeze. Meanwhile, two eastern projections of the approaching floes had met; and one of these, which was ex-

pected to have been of sufficient strength to have stopped the motion of the ice, was unfortunately shivered to pieces by the severity of the pressure*. At this time, a thin part of the southern floe lay against the starboard-side of the ship, readily squeezed up, and appeared incapable of doing any damage, while two pieces of ice, touching the northern floe, and pressing against the larboard-side of the ship appeared so small, that their action was not regarded. From neither of these, therefore, did we apprehend any danger, particularly as the motion of the ice soon abated; and as the ship never showed any symptom of a dangerous pressure, such as lifting abaft†, heeling to one side, shaking of her frame, or cracking of the timbers, we imagined that she had escaped without damage. There was a danger, however, on the larboard-quarter, of which we were totally unconscious. The piece of ice that touched the ship in that part, though of itself scarcely six yards square, and not more than one yard above

* While we were thus endangered, the John was in circumstances still more alarming. After she had passed the narrow channel through which we made the first attempt to escape, she was suddenly involved by distant ice, and made a very narrow escape from being crushed to pieces.

† Ships pressed by the ice abaft, almost always rise to a considerable height above the usual floating line; hundreds of ships have been lifted several feet without sustaining any damage.

water, concealed beneath the surface of the sea, at the depth of 10 or 12 feet, a hard pointed projection of ice (called by the Greenlandmen a *tongue,*) which pressed against the keel, lifted the rudder, and caused a damage that had nearly occasioned the loss of the ship. Yet so perfectly unconscious were we of any danger, that we employed ourselves about an hour and a-half after the accident, endeavouring to heave the ship a-head, into the adjoining indentation or bay at which we originally aimed, as a place of greater security; and it was not until the pressure relaxed, and the ship began to sink in the water, that we became in any degree sensible of our danger. The carpenter then having sounded the pump, discovered, to our great concern, a depth of 8½ feet water in the hold! This amazing flow of water in so short a time, was most alarming. With despair pictured in every face, the crew set on the pumps. A signal of distress was at the same time hoisted, which was no sooner seen, than a dozen boats approached us from the surrounding ships. Bailing, by means of tubs and buckets at the fore-hatch-way, fore-scuttle and companion, was resorted to, to assist the effect of the pumps. These means, together with the two principal pumps, (of 9 inches bore or diameter,) and a spare pump in the fore-hatch-way, delivered such an astonishing quantity of water, that in a very short time, the men were enlivened by the intelligence, that the water dimi-

nished rapidly in the hold, and that the ship began to rise again. In the space of four hours the water had lowered to nearly four feet; but the forehatchway pump then becoming useless, and the bailing being less effectual, the water once more resumed its superiority and gained upon us.

Something, therefore, was now to be done to stop, if possible, the influx of the water. As the leak could not be found in the inside, *fothering**, as being the most common and ready means, was (as soon as the floes were sufficiently separate,) immediately resorted to. But what was our astonishment to find, when about to apply a sail to the quarter of the ship, the place where the water seemed to enter, that the "after keel" was entirely detached from the timbers to the distance of nearly two feet, turned into an horizontal position, and all the bolts drawn; while, along with it, a large portion of one of the *garboard-strakes*† was torn from its place! This singular po-

* *Fothering*, is a peculiar method of endeavouring to stop a leak in the bottom of a ship while she is afloat. It is performed by drawing a sail, by means of ropes at the four corners, beneath the damaged or leaky part, then thrusting into it a quantity of chopped rope-yarns, oakum, wool, cotton, &c.; or by thrumbing the sail, that is, sewing long bunches of rope-yarn all over it, before it is placed beneath the ship. These materials being sucked into the leaky part, the flow of the water into the ship is interrupted, or at least diminished.

† *Garboard-strake* or *sand-strake*, is the first range of strakes or planks laid upon a ship's bottom, next the keel, into which it is *rabitted* below, and into the stem and stern-post at the ends.

sition of the keel, rendered fothering impracticable, or at least in a great measure ineffectual; we, therefore, endeavoured to stop some of the leak, by thrusting bundles of oakum down to the place by means of poles and tubs, a part of which remained beneath, and seemed to do some little service. A sail was next applied to the place, but, owing to the circumstances just mentioned, without producing any effect.

In consequence of the vigorous assistance of about 150 men from the John, North Briton, Don, Superior, Elizabeth, Perseverance, &c. the water, though it could not be wholly withdrawn, was yet so kept under in the hold, that, for the space of twenty-four hours, it fluctuated between the depth of four and six feet. As, however, the pumping and bailing could not possibly be continued by our own ship's company, it was necessary to make use of some means to attempt a speedy remedy, whilst our assistants were numerous. The different plans which I conceived might be adopted in the present case, or which I knew had been adopted to stop a leak in former cases, were the following, viz.

I. *To fother.*—I proposed to attempt to pull the keel entirely away, that the plan of fothering might be adopted with a better prospect of success. This, however, was strongly opposed by some able carpenters, who conceived, that the removal of the keel

might tear away more of the *garboard-strake*, and occasion the immediate loss of the ship.

II. To *heave the ship down*,—that is, to discharge the whole of the cargo and stores upon the ice, turn the ship on one side, until the wound should come above water, and then repair it. This plan was particularly recommended by all the masters who visited me, and by most of the carpenters.

III. To *caulk the ceiling*.—It appeared to me, that, could the ceiling or inside-planking be made water-tight, as it yet remained uninjured, it would swim the ship, though the whole of the keel were removed. But as the whole of the ceiling could not be come at, on account of the water which lay upon it, and as the caulking of the whole ceiling would require more time and materials than we could command, the same purpose, I conceived, would be answered, by making a stop-water between two of the frames of timber on the fore part of the leak, and caulking the ceiling abaft it. This plan, however, could not be adopted, unless the water were withdrawn; it was not, therefore, at this time practicable.

IV. To *well the ship*.—This operation, consisting in the building of a bulk-head or partition on the fore part of the leak, and caulking it, so as to confine the water within it, would likewise require a stop-water between two frames of timber, to prevent the water making a passage between the timber and

planks. As it likewise would require the water to be wholly extracted, it was therefore impracticable. And,

V. To *turn the ship keel upward.*—This plan, being a kind of desperate experiment, I was determined to adopt, in the event of all others failing. To effect this, it would be necessary first to discharge the cargo, and to unrig the ship, then, letting her fill with water, after securing the cabin-windows and hatches, to turn her keel up, and repair the damage; and, lastly, to return her back to her proper position, and pump out the water. In performing these operations, the aid of some other ship to assist in heaving the Esk down, and returning her back, would probably be indispensable.

With the *2d* and *5th* plans particularly in view, we now set about unrigging the ship, and discharging the cargo and stores upon a flat place of the floe against which we had moored.

As there was a chance that a bunch of rope-yarns, straw or oakum, might enter some of the larger leaks and retard the influx of water, if applied near the place through the medium of a fothering sail, we, in the mean time, prepared a lower studding sail, by sewing bunches of these different materials all over it, which, together with large shreds of old thin canvas, whalebone-hair, and a quantity of ashes, fitted it well for the purpose. Thus prepared, it

was hauled beneath the damaged place; but not the least effect was yet produced.

During the whole of Saturday, (the day on which the accident happened,) together with part of Sunday, we received ample and vigorous assistance from neighbouring ships, which was increased on Monday morning by some men from the Royal Bounty, the Margaret, John, and North Briton.

By this time my own sailors were completely worn out, and most of our auxiliaries wearied and discouraged; for the water gained to the depth of nine feet in the hold, in spite of the utmost exertions of the men who last arrived, though they were fresh and active. It therefore appeared, that there could be neither justice nor prudence in exhausting these men also, where there did not appear to be even a possibility of advantage resulting from their labours. Hence, as the ship could never be hove down while any water remained in her, this plan was, of necessity, abandoned; and the 5th plan, which alone remained to keep alive our hopes, was resorted to. The pumps, meanwhile, were merely kept in action until the ship should be in readiness. Preparatory to putting the plan in execution, we placed twenty empty casks in the hold, to act against a quantity of iron ballast which was in the ship, caulked the dark-lights, removed all the dry goods and provisions that would injure with the wet, secured all the hatches, scuttles, companion,

&c., then, erecting two tents on the ice, one for sheltering myself and the other for the crew, we ceased pumping and permitted the ship to fill.

I was the more ready to attempt this experiment, when I considered, that our assistance must soon fail us, as many who were forward to help in the beginning had already deserted us; and that the crews of two ships before they left us, had become so careless and trifling, that they retarded every operation by their untimely levity. It was peculiarly distressing to me to observe, that men who had come apparently with the intention of aiding us, not only were useless themselves, but relaxed the exertions of others by their open declarations, that the state of the ship was without hope. These inconsiderate men did not even scruple to converse, in the hearing of our people, on the subject of plundering the ship the moment they had the opportunity, and even were heard to name the particular articles of which they would endeavour to make prize. One fellow had the impudence to demand of our blacksmith for some iron-work which he found in the ship, intimating, that in a short time it would be the prize of any one,—another pilfered a musket,—others were observed examining some small sails which lay on the ice, with a view, doubtless, of seeing how far they would suit their convenience. Some of this unfeeling party, when at the pump, evinced, by their improper conduct, their wish that the ship were abandoned. Instead of

pumping, I could observe them treating the service in which they were employed as a mere jest. The two great pumps being worked with the same machine, the men on one side of the deck would frequently baulk the stroke of those on the other by an untimely jerk; then the whole gang would express their amusement by bursting into a laugh! I was so grieved with their conduct, that I was on the point of ordering them to leave the ship, when I was fortunately relieved from the trial, by their voluntary departure, immediately on the arrival of the fresh force from the Royal Bounty and Margaret.* The tantalizing behaviour of these men, might possibly be encouraged, if not excited, by the unmanly spirit which was evinced by many of my own crew. Men of whom I had conceived the highest opinion for firmness and bravery, greatly disappointed my expectations at this crisis. Among the whole crew, indeed, scarcely a dozen spirited fellows were to be seen. One of the principal officers refused to work any longer in the hold, until I appeared at the hatchway and put him to the blush; another officer, a boat-steerer,

* Captain Allen being informed, that one or two of his men had been guilty of some improprieties of conduct while on board the Esk, ordered the future allowance of grog of the guilty individuals to be stopped during the voyage. This gentleman likewise, I was told, enforced a caution to his crew against plundering, by threatening to stop the wages of any man who should be found to trespass in this respect.

whom I ordered to fill the bailing tubs, quitted his station, on the weak pretence, that the water was spilt upon him! My chief mate, however, and a few others, it is but justice to say, shewed that arduous zeal, that steady obedience and unrelenting perseverance, which are properties when combined, that dignify the seaman, and characterise him as truly British! And, notwithstanding some of the men who visited us, were considered rather as a burthen than a help, yet there were others who acquitted themselves to admiration. Most of the people belonging to the John and North Briton, were unexceptionable, as well as those of the Margaret, during their short stay, those belonging to the Prescot and some others. My brother Jackson, though his ship was on the opposite side of a floe, scarcely ever left me; and the master of the North Briton, Mr Allen, behaved in a most gentlemanly manner. Some of the officers of different ships, though unknown to me, distinguished themselves by their activity and zeal for our service.

As no ship could with propriety venture near us to assist in turning the Esk over, on account of the hazardous position of the ice around her, we had no other means of performing this singular evolution than by attaching purchases to the ice from the ship. We proceeded as follows: A new hawser of 9½ inches circumference, was taken under the ship's bottom, the end clenched to the main-mast, and the

other part taken upon the ice: this was then connected, with different purchases fixed to the ice, in such a way, that the power was increased thirty-six times; or, abating friction, I suppose every man would be able to produce the effect of nearly a ton. The other end of the same hawser, was in a similar way attached to the fore-mast, and, by means of ice-anchors, and a complex combination of blocks, was also connected with the ice. When, therefore, these purchases should be put in force, the hawser would have a tendency to draw the keel upward, towards the edge of the floe across which it lay, and to pull the offside gunwale downward, and consequently to reverse the position of the ship. For the purpose of increasing the effect of the purchases, as well as for retaining the ship's masts downwards, if the reversion should be performed, we suspended an anchor from the main-mast-head, and another from the fore-mast-head, by means of hawsers, applied in such a way that one part went under the ship's keel, and could be cut when it was required to restore the ship to her former position. These anchors being likewise connected with the ice, by means of a slack-rope, would be preserved from sinking, when they should be separated from the ship by cutting the hawser at the keel.

Every thing being thus prepared, whilst the water flowed into the ship, I sent our exhausted crew to seek a little rest. For my own part, necessity

impelled me to endeavour to obtain some repose. I had already been fifty hours without rest, which unusual exertion, together with the anxiety of mind I endured, caused my legs to swell, and become so extremely painful, that I could scarcely walk. Spreading, therefore, a mattrass upon a few boards laid on the snow, within one of the tents, notwithstanding the coldness of the situation and the excessive dampness that prevailed from the constant fog, I enjoyed a comfortable repose of four hours, and arose considerably refreshed.

Immediately afterwards, (about 8 P. M. of the 1st of July,) I proceeded with all hands to the ship, which, to our surprise, we found had only sunk a little below the 16 feet mark externally, while the water but barely covered a part of 'tween decks within. Perceiving that it was not likely to sink much farther, on account of the buoyancy of the empty casks, and of the materials of which the ship itself was composed, we applied all our purchases; but, with the strength of above 150 men, we could not heel her more than 5 or 6 strakes. When thus careened, with the weight of two anchors suspended from the masts acting with the effect of powerful levers on the ship, I accompanied about 120 men on board. All these being arranged on the high side of the deck, ran suddenly to the lower side, when the ship fell so suddenly on one side, that we were apprehensive she was about to upset; but, after turning

a little way, the motion ceased. The tackles on the ice being then hauled tight, the heeling position of the ship was preserved, until we mounted the higher part of the deck, and ran to the lower, as before. At length, after a few repetitions of this manœuvre, though the weight of men suddenly passing from side to side, could not be less than 8 tons, no impression whatever was produced *.

On account of the peculiar buoyancy and stability of the ship, it hence appeared, that the plan of upsetting her was not practicable, without the aid of some other ship to assist by additional purchases; and, as no other ship could with safety be brought to us, this method was at length relinquished.

The situation of the ship being now desperate, there could be no impropriety in attempting to remove the keel and garboard-strake, which prevented the application of the fothering: for, whatever might be the result, it could scarcely be for the worse. Putting, therefore, the *bight* of a hawser over the end of the detached part of the keel, we fastened one end to a timber head, and, with the other at the capstern, soon hove it asunder; but immediately slipping out of the rope, it sunk †. The

* The frontispiece to Vol. I. represents the state of the Esk at this juncture.—See the Explanation of the Plates, Appendix, No. X.

† This piece of keel was 22 feet in length.

piece of garboard-strake yet remained attached to the ship; a line was with some difficulty fixed to it, but it was found insufficient to drag it off; a hawser likewise failed, though we contrived to clench it round the plank, until, after heaving upon it in various positions, it was at length torn asunder. This plank we found was 9 feet in length, and had attached to it a piece of the *dead wood*, 6 inches in thickness.

These incumbrances being removed, the *thrumbed* sail for fothering was immediately applied to the place, and a vast quantity of fothering materials thrown into its concavity, when it was fairly underneath. Over this sail, we spread a fore-sail, and braced the whole as tight to the ship as the keel-bolts which yet remained in their horizontal position, would permit. The effect was as happy as we could possibly have anticipated.

Some time before all these operations were completed, our people, assisted by the John's crew, who, after a short rest, had returned to us, put the three pumps and bailing tubs in motion, and applied their energies with such effect, that in eleven hours the pumps sucked! In this time, a depth of 13 feet water was pumped out of the hold, besides the leakage. The John's crew remained at the pumps yet four hours longer, until our own men cleared the after-hold of casks, and got every thing in readiness to put in execution the caulking of the ceiling, agreeably to

the method I proposed in plan No. III. The John's crew, on this occasion, exerted themselves with a spirit and zeal which was truly praiseworthy. Their conduct not only merited, but excited the approbation and gratitude of the whole of my people.

As our men were by this time again worn out, and as the assistance of some carpenters was particularly needed, we fired a gun, and repeated our signal of distress, which brought, very opportunely, two boats, with six men each, from the Prescot, and the same number from our tried friend Mr Allen, of the North Briton. As we likewise procured the carpenters of these two ships, together with those of the John, they commenced operations by cutting through the ceiling, between two frames of timber, directly across the hold, at the distance of about 26 feet from the stern-post; a situation which, we were assured, was on the fore part of the leak, or between the leak and the body of the ship. The timbers, in this place, were unfortunately found so closely connected, that we had to cut away part of one of the floors, that we might come at the outside plank, and caulk the crevices between it and the timbers; which operation, on account of the great depth of timber, and the vast flow of water that issued at the ceiling, was extremely difficult, tedious, and disagreeable. A man of the name of Nicholson, the carpenter of the North Briton, laboured in this place among the water, with a perseverance

and assiduity that was really astonishing, notwithstanding every blow of his axe brought a shower of water about his head.

Meanwhile that we had good assistance, I allowed our crew four hours rest, half of them at a time; for which purpose, some of their beds were removed from the ice to the ship. Here, for the first time during four days, they enjoyed their repose; for, on account of the cold and damp that prevailed when they rested on the ice, several of them, I believe, never slept. Some of the John's people, returning to us, swayed up the top-masts, and rigged most of the yards, while our men were employed stowing the main hold, which, by the floating of the casks, was thrown into a singular state of disorder. Some of the casks were found without heads, and all the blubber lost, and many were found bilged, or otherwise damaged.

After the carpenters had completely cleared the *roomstead**, they drove oakum into it, along with an improved woollen *sheathing* substance, and occasionally, where the spaces were very large, pieces of fat pork. The spaces or crevices between the planks of the ceiling and the timber being then filled, all the above substances were firmly driven down by means of pine wedges, and the space between each of the

* *Roomstead* is the space between any two ribs or frames of timber in a ship.

wedges caulked. This would have been very complete, had not the increased flow of water overcome the pumps, and covered the ceiling where the carpenters were at work. They were, therefore, obliged to wedge up the place with great expedition; and being at the same time greatly fatigued, the latter part of the operation was accomplished with much less perfection than I could have wished. We, however, were happy to find, that the intention for which we laboured, was in some measure accomplished; for no sooner were the wedges driven from side to side, and the interstices caulked, than the water, being no longer able to find a free passage between the outside and inside planking, as it had previously done, now sprung through the ceiling, abaft the stop-water, in numerous little jets.

Hitherto calm weather, with thick fog, having constantly prevailed, was the occasion of several ships remaining by us and affording us assistance, which would otherwise have left us; but the weather having now become clear, and a prospect of prosecuting the fishery being presented, every ship deserted us, except the John, and she was preparing to leave us likewise. The knowledge that we should, in a few hours, be left entirely alone, in a ship that was little better than a wreck, and in a situation of perpetual jeopardy, at the distance of 100 miles from the sea,—the persuasion that, from the great quantity of water which yet flowed into the hold,

the ship would sink in consequence of the most trifling accident or increase of the leak,—the certainty that, under the most favourable circumstances, considering the dilapidated state of the ship, her cargo, sails and stores being principally on the ice, it would require a considerable length of time before the ship could possibly be removed, as the greater part of the crew must be constantly employed at the pumps,—the great probability there was, considering the advanced state of the season, that all the fleet of whale-ships would immediately endeavour to remove into safer ice, near the sea, and consequently, that should the ice in which we occupied a dangerous position *, eventually crush the ship, there would be no refuge for us, but what was at such a distance that it might, by the clearing of the ice, be rendered inaccessible,—the consciousness, that were the ship safely out of the ice, she might yet founder at sea, from the fothering sails washing away, or from the water accumulating in the lee-bilge during a gale of wind, and

* It was somewhat remarkable, that during the first five or six days after the accident, the two floes between which the ship received the damage, were in frequent contact at a small distance from us. Sometimes they approached each other, where the ship lay, within a few yards, at others, intermediate pieces of ice would almost touch her. Under any other circumstances we should have been in constant alarm;—as it was, we were too much involved in distress to be sensible of any augmentation of danger from the ice.

hence the lives of the crew would in all probability fall a sacrifice to their temerity;—these numerous and important considerations were so strongly impressed on the minds of the sailors, that they appeared determined to quit the ship and take refuge in the John, as soon as she should attempt to leave us. That they had determined on this, I had sufficient information to convince me; and, from the knowledge of the character of many of my crew, who, from their conduct during the preceding operations and trials, proved themselves to be in general a spiritless set of men, I was confident, that unless the assistance of the John were by some means secured, the Esk, after all the labour bestowed on her, and the progress which had been made towards her preservation, must yet be abandoned as a wreck! Some of my men had long importuned me to hire the attendance and co-operation of the John, by giving up to her the half of our cargo, if less would not suffice:—these importunities I constantly resisted, until, finding the necessity of the case, I at length, at the unanimous request of my whole crew, made the proposal to Captain Jackson, who, with the consent of his crew, agreed to stay by us and assist us, agreeably to the conditions of the following contract; the original of which was voluntarily signed by every individual of both ships' companies.

Greenland Sea, 3d July 1816.

The ship Esk of Whitby being in distress, and the crew of themselves unable to preserve her, it is agreed between the undersigned masters, officers, and seamen of the ship John of Greenock, and of the said ship Esk, that the former shall afford assistance to the latter, agreeable to the terms and conditions following:

I. That the ship John shall remain by the Esk, and shall accompany her to some port of Shetland, if required, and that the crew of the John shall, during the fitting of the Esk for the passage, and during the passage to Shetland, assist to the utmost of their power, in any measures necessary for her preservation.

II. In consideration of which services, the crew of the ship Esk do agree to give up to the ship John, forty-eight tons of oil, or blubber in proportion, after the rate of four tons of blubber to three tons of oil, together with one-half of the Esk's present cargo of whalebone,—and hereby they consider themselves as having relinquished all title and claim to the said oil and whalebone, as well as to any wages, oil-money, fish-money, or other perquisites, which might be dependent thereon.

III. It is agreed by the master of the Esk, on the part of his owners, that provided the ship Esk shall, by the united exertions of the two ships' companies, be preserved and arrive safe at the port from whence she sailed, and that the John accompanies, and the crew assists so far as Shetland, the sum of One hundred pounds shall be given by the owners of the Esk to the crew of the John, to be equally divided amongst each individual, excluding harpooners.

IV. It is likewise agreed by the master of the Esk, on the part of his owners, that provided any of the John's

crew, by the unavoidable separation of the ships, shall be carried to Whitby, a reasonable allowance for their travelling expences homewards, shall be paid them.

And, V. It is mutually agreed by all parties, that should any dead fish be found or other whale be captured within the limits of this contract, whichever of the ships' crews it or they may be seen, struck, or killed by, the whale or whales so found or captured, shall be equally divided between the two ships.

[Signed by all Hands of each Ship.]

I preferred thus giving up a quantity of blubber to paying any pecuniary salvage, for two particular reasons: First, Because, should the ship eventually have been lost, the above award would become no gift at all, since any ship which had fallen in with the wreck, might have appropriated the same to their own use, with the probability that no part of it could be claimed by the owners of the Esk: Secondly, Because any pecuniary salvage that might have been agreed on must have been paid, whether the ship might eventually have been saved or lost; for, as the people of the John, in affording assistance, would be obliged to sacrifice their future prospect in the fishery of the same season, they would have a reasonable claim on a remuneration for the sacrifice they made, whatever might be the result of their endeavours to save the ship. Thus, by giving blubber as a salvage, we gave away merely what we were unable to take home of ourselves, or, in other words, what we could not keep.

In making this contract, I should have been fully justified in acting according to the best of my judgment for the benefit of the owners, without consulting the will of the crew; but as it was their first proposal, and in a great measure their own act, and particularly as each individual was more or less interested in the blubber given up, and might have been induced, on arrival, to have demanded wages and perquisites on it, the same as if it had been taken home, I judged it a matter of prudence to procure each man's written acknowledgment to the contract, whereby the decision of the case as to their claim for wages on the blubber given up to the John, would be placed within the power of the owners, without any one having the means of questioning that decision.

The acquiescence of the John's crew was only necessary, to sanction the master's conduct in leaving the fishing country with half a cargo before the usual period, whereby, for the advantage obtained from us, they sacrificed their chance of further success in the fishery of the season.

As the foregoing agreement was not sufficiently explicit and binding on the part of the masters and owners of the Esk and John, the following contract being drawn out, was signed by myself and Mr Jackson.

AGREEMENT, &c.

The ship Esk, of Whitby, lying at a vast distance from the sea, in a dangerous situation of the ice, being seriously damaged, extremely leaky, in a great measure unrigged, her cargo and stores discharged, the ship a mere hulk, and altogether in great distress,—her crew at the same time being worn out by hard and continued labour, and unable of themselves to preserve the ship from sinking and take her home,—are circumstances which render the assistance of some other ship indispensable. The master and crew of the ship John of Greenock, therefore, being willing to afford the requisite aid, it is hereby agreed between the undersigned masters of the two ships, the Esk and the John, that such requisite assistance shall be afforded on the one part, and that such certain award shall be presented on the other, as are expressed in the conditions and terms following:

Part I.—The undersigned Thomas Jackson, master of the ship John of Greenock, on his own part, and on the part of his owners, with the unanimous consent of every individual of his crew, doth engage and agree to the four articles next following:

1. That he will, with his ship and crew, to the utmost of his power, assist and endeavour to preserve the ship Esk, to rig her, to stow her cargo and stores, and to fit her for the passage homewards.

2. That he will then take her in tow, when practicable, and use every exertion to remove her from the place where she now lies, and attend on and accompany her homewards, as far as some port of Shetland, if required.

3. That he will at all times furnish the Esk with as many of his crew as he can conveniently and safely spare, to assist in pumping and navigating the Esk on the homeward passage to Shetland. And,

4. That he accepts of *as*, and declares the award hereinafter mentioned *to be*, an ample and sufficient compensation for the services he hereby engages to perform; and that no claim in the way of salvage, demurrage, or other circumstance, shall or can hereafter be made by himself or owners of the John, on the master or owners of the Esk.

PART II.—In consideration of which services, the sacrifice of all future expectation from the fishery of the present season, the consequent detention, and so on,—the undersigned William Scoresby *junior*, master of the ship Esk, on his part, and on the part of his owners, with the free and unanimous consent of every individual of his crew, doth engage and agree as follows:

1. That he will abandon into the possession of the ship John 48 tons of whale-oil or blubber accordingly, after the rate of 8 butts to 3 tons, together with one-half of the whalebone, or thereabouts, which may at present form the cargo of the Esk.

2. That the above quantity of blubber and whalebone shall become the property of the owners of the ship John, on which himself or owners can have no claim whatsoever, on the conditions of Part I. being accomplished.

3. That provided the ship Esk shall, by the united exertions of the crews of the two contracting ships, be preserved, arrive at the port from whence she sailed, and that the John accompanies and the crew assists to the utmost of their power, so far as Shetland, as agreed; he, on the part of the owners of the Esk, agrees to pay, in addi-

tion to the whalebone and oil above specified, the sum of One hundred pounds, to be equally divided among the John's crew, harpooners excepted. And,

4. Should any of the John's crew, by the unavoidable separation of the two ships, be carried to Whitby, a reasonable allowance for their travelling expences homewards, shall be paid them by the owners of the Esk.

PART III.—It is furthermore mutually agreed by the undersigned William Scoresby *junior*, and Thomas Jackson, on their own parts, and on the part of their owners, and as far as concerns them, with the free and unanimous consent of their respective crews, as follows:

1. That provided the ship John shall, by any casualty, be obliged to separate from the Esk, and withdraw her assistance, within the space of seven days from the date hereof, the award mentioned in Article 1., Part II., shall be considered as the joint property of the owners of the two ships, and that accordingly, the one-half of the oil and whalebone, as therein awarded, or the value thereof, free of all charges for freight, demurrage, or other circumstances, excepting actual outlay, shall be returned to the owners of the Esk, as soon after the arrival of the John at her port, as conveniently may be.

2. That should any dead fish be found, or other whale be captured within the limits of this contract, whichever of the ship's crews it or they may be seen, struck, or killed by, the whale or whales so found or captured, shall be equally divided between the two ships. And it is declared,

3. That all the foregoing articles and stipulations of this contract are entered into, not from any regard of relationship, friendship, or other human tie, but from the sole principle of

mutual obligation, consequently for the benefit of the owners of each concern. The award is thus given on the part of the Esk from the urgent nature of the circumstances, and accepted on the part of the John, from the small probability there is of procuring such an increase to her cargo elsewhere.

Done on board the Esk, at six o'clock P. M. (civil day,) of the 3d day of July 1816.

Signed THOMAS JACKSON,
WILLIAM SCORESBY *jun.*

Signed *John Dunbar*, *Willm. Ward.* } Witnesses.

These agreements being fully understood and signed, the John hauled alongside of the ice, which had now opened near the Esk for the first time since the accident, and took on board the whole of our loose blubber, estimated at 78 butts, and 51 butts in 25 casks, together with about half of our whalebone as agreed. In the mean time, we hauled the Esk a little out of the way, and proceeded in stowing the casks in the *main* hold; in stowing and filling with water the casks of the *after* hold; in caulking and battening the seams of the ceiling, &c. &c. In the bilges of the ship, beneath the fore-hatchway, we placed two empty casks on their ends, with the upper heads taken out, and the lower heads bored full of holes, for the purpose of admitting the water which might accumulate in the ship when heeling, and freeing it from any sub-

stances calculated to choke the pump or pumps which might be introduced into the casks for extracting it*.

Every thing now going on favourably, whilst our crew and assistants were in full and vigorous employment, I was obliged to retire to seek that repose which my wearied frame could want no longer. During 120 hours I had rested only 12, whereas in ordinary circumstances, I should have indulged, myself in 40, or 50 hours of repose. It was not therefore surprising, that the swelling and pain of my legs became so serious, that I could scarcely move about. In justice to Mr Jackson, I may observe, that in the course of the same period, he voluntarily submitted to similar privations as myself.

During the 4th of July, we had a fresh breeze of wind, with fine weather. The floe to which the ship was moored, was found to have performed two-thirds of a revolution in the course of the five preceding days.

For the purpose of securing the sails which were beneath the ship, in their places, when she should be put in motion, I adopted the following contri-

* This contrivance we found exceedingly useful; for on the passage homeward, the chips produced by the carpenters in making the stop-water in the hold, frequently choked our principal pumps, and annoyed us exceedingly. We were repeatedly obliged to hoist them out and clear the pump well; sometimes twice or thrice a-day.

vance, which, on account of the concavity of the ship near the stern, was particularly requisite. First, two ring-bolts were driven into the stern-post at the water's edge, one in each side, and the same at the bows. Two thick ropes were then connected, by means of several similar pieces of whale-line, placed at equal distances on each, in the form of a rope-ladder, in which the *steps* or connecting pieces of whale-line were 11 feet in length. The ends of the thick ropes being then fixed to the ring-bolts in the stern-post, the ropes themselves were extended along the bottom of the ship, put through the bow-ring bolts, and by the hawse-holes connected with the windlass. When, therefore, they were drawn tight, the connecting pieces of the whale-line embraced the sails, pressed them closely to the ship, and had a surprising effect in diminishing the influx of water into the hold.

On the 5th, assisted by all hands from the John, our people, after four hours rest, applied themselves with such vigour, that the stowing of the hold and the rigging of the ship were completed; the materials of every description removed from the ice, and the sails set, before seven o'clock in the morning. The ice having then cleared away in a most favourable manner, under a moderate breeze of wind, we left the floe; but what was our astonishment and mortification to find, that the ship

could not be guided! The rudder was become perfectly useless,—so that, with the most appropriate disposition of the sails possible, and the requisite position of the helm, the ship could not be turned round or diverted in the least from the course in which the impetus of the wind on the sails was the most naturally balanced. This was an alarming disappointment. However, as the ship was in such constant danger of being crushed in the situation where she lay, the John, with the greatest difficulty imaginable, towed us three or four miles to the eastward into a place of comparative safety. Under other circumstances, it would have afforded matter of much amusement to see the singular way in which the Esk was drawn forward. She could not be brought to proceed fifty yards on the same course, notwithstanding the most prompt and appropriate adaptation of the sails and helm, but continued sheering from side to side to the utmost extent that the rope, by which she was towed, would allow. On one occasion, this rope was broken, and we were obliged repeatedly to slack it out, to prevent a recurrence of the accident. About 10 A. M. we moored to another sheet of ice, and immediately proceeded to attempt a rectification of the ship's steerage. For this purpose we unshipped the rudder and hoisted it upon deck, where we applied an additional piece to the lower and back part of it, consisting of a surface of about

20 square feet of planks on either side, united and consolidated by blocks of timber. We likewise secured the corners of the fothering sails to staples driven into the *counters* of the ship, whereby less interruption was made in the course of the water to the rudder, and consequently a better effect might be expected from it. And lastly, we filled a number of empty casks in the after-hold, some with sea-water out of the ship's hold, and others with fresh water from the surface of the ice, for the purpose of *trimming* the ship more by the stern, to compensate in some degree for the loss of the after-keel.

All these matters being completed, we should have immediately made sail, but on account of a strong wind and thick weather we could not, without imminent danger, attempt to penetrate the compact body of ice, that at this time barred our escape to the sea. I therefore took the advantage of the opportunity to procure a long rest, which I found so refreshing, after the unusual exhaustion I had experienced, that I arose after many hours, perfectly restored.

In the forenoon of the 6th of July, the wind subsided, and the fog cleared away; we therefore cast off from the ice. When the ship was under sail, we made the necessary experiments of wearing, tacking, plying, &c. in which we were pleased to find, that the rudder answered the intention, though,

on account of the slow and leewardly motion of the ship, an attempt to ply to windward entirely failed. Meeting shortly with an impervious mass of ice, lying directly across our track, which, on account of the direction of the wind, and the return of the fog, we could neither *weather*, nor discover a passage through,—we moored, along with the John, to a detached piece of ice. The attention of the carpenters in caulking the ceiling of the ship, together with the advantage derived from the fothering sails, had now produced an effect so considerable, that, on Sunday, the 7th of July, the original leakage was found to be reduced nearly four-fifths! During an hour, in which we were engaged in the performance of Divine Service, the pumps were allowed to "stand;" 2½ feet of water, which, in this interval, flowed into the hold, was pumped out in twenty minutes.

The weather having cleared, (on Sunday evening,) a passage to the eastward was discovered among the floes. An easterly wind, however, prevailing, we were unable to make any progress, until the John took us in tow. After plying 3 or 4 miles to windward, we entered a narrow channel, leading to a roomy situation, in a south-easterly direction. Though a quantity of drift-ice lay in this channel, and, in one instance, the John had occasion to force a passage for the Esk, yet we passed through the midst of it without striking a single piece of ice.

On the 8th, we stretched to the S. S. E. until 5 A. M., in a free navigation, though ice in vast bodies extended on either side us. A floe then interrupting our course, we were obliged to work to windward of it; a field afterwards appeared connected with it, along the side of which we had still to beat against the wind, towed by the John, a distance of several miles. At 10 P. M. there appeared a favourable channel leading to the S. E., which we pursued; and, after winding among numerous pieces of drift-ice, with occasional heavy floes, until the morning of the 9th, we again had the relief of an easy navigation. This day we had a gentle favourable wind, with pleasant clear weather. Several ships were seen. Saw a whale, and sent from the two ships, three boats in pursuit, but were not successful. The John, running foul of a piece of ice, in attempting to drag us round it, launched upon a tongue, and grounded. She remained about half an hour immoveable; meanwhile we proceeded alone. At mid-night we saw the land, Charles' Island, or the Foreland, about 60 miles distant; at the same time, we passed clear, to seaward, of all the ice within sight. Latitude 77° 24′ N.

Our carpenter continued his labours in the after-hold, with some effect, though, in general, fresh leaks were daily breaking out. For the security of the ceiling, a great number of *stanchions* were placed between it and the beams of the gun-room

deck, to prevent the pressure of the water from forcing the planks from the timbers.

On the 10th, spoke the Valiant and the Phœnix. The latter ship furnished us with a spare pump, which we considered a great acquisition to our means of security. We had now in readiness four pumps, two of which were placed in the casks that we had fitted as pump-wells, in the bilges of the ship. We saw the last ice on the 11th. To this period, we had generally half of the John's crew on board. We now had twelve men, selected for our service, whom we classed along with our own crew.

In the morning of the 12th, the wind increased from the east; the sky became dark and threatening; and a heavy swell rolled from the south-eastward. The violent agitation of the ship, together with her increased velocity, very soon tore away many of the fastenings of the fothering-sails, which we soon perceived towing astern of the ship. This circumstance occasioned a considerable alarm. We had not before ascertained how far the contrivance of swimming the ship by the ceiling could be depended on: the experiment was therefore made at a very critical moment, when the sea was so considerable, that it would have been a matter of much uncertainty, whether we could have escaped on board the John, in the event of the ship foundering. What added to our apprehensions was, that the leak appeared to increase, whilst the main pumps

became almost useless on account of the heeling position of the ship, and the accumulation of the water in the lee-bilge. The bilge-pumps, therefore, became of essential importance. Steered S. S. W., with a velocity of 3½ to 7½ miles *per* hour, under three courses, the top-sails and jibs. The John carried much more sail.

The swell continued, with some variation, during the two following days, though the wind was, in general, moderate and fair. On the 15th, our latitude was 71° 40′ N.

I now made some experiments to ascertain the quantity of water discharged by the pumps, from which some interesting deductions were made. I first gauged two tubs that had been used in bailing, one of which was found to be of the capacity of 18 gallons, and the other of 20. The former, I found on trial, was, at the common rate of pumping, filled with eight strokes from one pump. Shortly after the accident, I had observed, that from 55 to 75 strokes were made by each pump *per* minute; but I shall not consider the mean number more than 60. Therefore, as this tub was filled by eight strokes, and sixty were made in a minute, it would, of course, be filled 7½ times in a minute. Hence, 7½ multiplied by 18, (the contents of the tub in gallons), gives 135 gallons, as the quantity of water, usually discharged by *one* pump in a minute. From these data, together with the estimation of the

quantity of water discharged from the ship by bailing, it is not difficult to ascertain, very nearly, the whole quantity of water that was discharged, from the time of the accident, to this period. The means in use for the extrication of the water, during the early part of the period, were as follow.

	Gallons *per* Minute.
1. The two large pumps, which discharged	270
2. The extra smaller pump,	90
3. Two large tubs ¾ filled 6 times *per* min.	180
4. Two to four pails, 8 times *per* minute,	90
	630

Hence we may draw the following conclusions:

From the 29th of June, at 2 P. M., (the time when the damage was first discovered), to the 1st of July, at 10 A. M. a period of 44 hours, all the above means were in general use, for the discharge of the water, and were plied by 160 to 220 men, whereby 630 gallons, or 2½ tons, on an average, were discharged *per* minute. Hence 44 hours, or 2640 minutes × 2½,

	Tons.
	6600

The next 7½ hours was an interval of rest.

From the 1st of July, at 5½ P. M. to the 2d at 5½ A. M., an interval of 12 hours, the three pumps, and all the bailing vessels, were in the fullest possible play, whereby the hold was, for the first time, partly cleared of water.

Carried forward, 6600

Brought forward, 6600

Therefore, $2\frac{1}{2}$ tons, multiplied by 720, the number of minutes in 12 hours,.....1800

From $5\frac{1}{2}$ A. M. of the 2d of July, to 3 P. M. of the 3d, an interval of $33\frac{1}{2}$ hours, two pumps were in almost constant exercise, and sometimes three. Therefore, estimating the quantity of water at $1\frac{1}{2}$ tons *per* minute, we have 33.5 hours × 60′ × 1.5 tons,.....3015

From 3 P. M. of the 3d July, to 2 P. M. of the 7th, an interval of 95 hours, two pumps were in frequent exercise. Therefore, estimating the average quantity of water discharged at $\frac{3}{4}$ of a ton *per* minute, we have 95 hours × 60′ × 0.75 tons,.....4275

Tons, 15690

Hence, at a moderate computation, it appears, that between the 29th of June and the 7th of July, an interval only of eight days, the enormous amount of 15,690 tons of water were pumped and bailed out of the Esk's hold!

Hence, also, it appears, that during the first two days after the accident, the regular leakage was about,.....150 tons *per* hour.

During the 3d day,.....130 ditto.
4th day,.....100 ditto.
5th day.....70 ditto.
6th day,.....52 ditto.
7th day,.....34 ditto.
8th day,.....20 ditto.

These estimates, great as they may appear, do not, I believe, exceed the truth; especially as they are confirmed by the mensuration of the internal cavity of the Esk's hold, which affords results corresponding with the above, to a surprising nicety.

The 16th of July was a calm day. An oblong thrumbed sail, which had been several days in preparation, was, after many trials, placed and secured beneath the wounded part of the ship. It consisted of strong canvas, 8 yards in length and 3 in breadth; and was covered completely with long thrumbs of rope-yarns. The two edges were *marled* to two pieces of a hawser; and these ropes connected by a short piece of chain. The chain being then introduced between the rudder and the stern-post, was drawn closely upward; and the hawsers being extended to the bows, stretched the canvas firmly across the damaged place. The leak, in consequence, became for a time inconsiderable; but on the following day, having a fresh gale of wind from the eastward and considerable swell, under which we were sometimes towed with the velocity of 9 knots *per* hour, this well-adapted sail was rent, and shortly shared the same fate as those that preceded it. The leak immediately increased. The Phœnix joined us.

Our distance run on the 18th, was 184 miles, on a S. W. course. The water again alarmed us, by its accumulation in the lee-bilge, and the appearance

of several fresh leaks when the ship heeled. By shortening sail, however, and shifting a considerable weight of different articles to windward, our safety was secured. Our latitude 67° 16′ N.

On the 19th, a seven-inch rope by which we were towed, broke. We had great difficulty in getting another hawser on board of the John, on account of the turbulence of the sea; but, by means of several buoys, and a cask which was sent astern by the John, we at length succeeded. In the evening, we had fine weather; when the wind, for the first time during the passage from the ice, became contrary.

The 20th was a most agreeable day; the atmosphere was clear, sea smooth, wind moderate, and towards night favourable. Our latitude at noon, was, 64° 39′ N., and our longitude at 9 A. M. by lunar observation, was, 1° 4′ 30″ E. Leak on the increase.

The next day we had a fresh gale of wind from the eastward, strong south-westerly swell, and fog so dense, that the John, at the distance of 150 yards, was scarcely discernible. Our course was S. W. and S. b. W. ½ W. Latitude at noon, 63° 44′, longitude by chronometer, 1° 36′ E. This night, the first stars were seen since the month of April.

The easterly wind increased to a strong gale on the 22d; and at 3 A. M., when the ship's velocity was at 9 knots *per* hour, the pressure of the helm strained a new wheel-rope, and carried away the wheel-stanchion. Considering the stern-post endan-

gered, and, consequently, the ship itself, we immediately furled the after-sails, and so reduced the rest of our canvas, that we were in a great measure dragged by the John, which continued to carry a most prodigious press of sail. The sea being heavy, and the water collecting in the lee-bilge, whilst the leak was sensibly increased, were circumstances not a little alarming. A kind Providence, however, seemed to favour us, for appearances only were against us; the gale subsided, the ship righted, and the hold was easily cleared of water.

At 3 A. M. of the following day, we descried land; and at 10 A. M. Hangcliff, Shetland, bore W. b. N. distant about 15 miles. The wind being for a short time southerly, we steered towards the land, with the design of putting into Lerwick, and awaiting a better opportunity of pursuing our voyage; when, however, we approached within three or four miles of the coast, a S. E. breeze sprung up, which being favourable, we hauled to the wind on a S. S. W. course. In the evening, the John having fulfilled the articles of agreement, as far as was required, we sent the twelve men belonging to her crew on board, and after receiving from them a supply of fresh water, they left us with three cheers, and the usual display of colours. We were now left to sail by ourselves; our progress was, in consequence, rather slow.

On the 24th, we steered S. b. W. ½ W. with an east wind, instead of S. W. b. S., the usual course, for fear of getting on a lee-shore, off which, from the almost unmanageable state of the ship, it would not have been possible to work. On the 25th, the wind veered to N. N. W., and our velocity was considerable. The Phœnix accompanied us, and assisted us by towing, during the day.

At 7 A. M. of the following day, we descried the British land. At noon, St Abb's Head was at N. W. b. N., distant fifteen miles. In the afternoon the Phœnix left us and made sail, by the way of carrying the intelligence of our approach, and was, in a short time, far a-head*. In the evening we had a south wind, and at night a westerly breeze, under which we proceeded with a pressure of sail along the coast. At day-light of the 27th, we were rejoiced with a sight of our port. Knowing the flow of water to be sufficient for the ship, and there being a probability of reaching the harbour before the tide was too much fallen, we pressed towards it with every sail we could set; and having received a pilot as we approached the pier, we immediately entered the harbour, and grounded at 5½ A. M. in a place of safety.

Thus, through the peculiar favour of God, by whose influence our perseverance was stimulated, and

* The Phœnix, owing to some little accident, arrived in the harbour a tide later than us.

by whose blessing our contrivances were rendered effectual, happily terminated a voyage at once hazardous, disastrous, and interesting.

Intelligence relative to the distressed state of the ship, and the hopelessness of her situation, reached Whitby the day before us; and involved, in consequence of some exaggerations respecting the loss of the crew, every interested person in deep distress. Throughout the town, and in a great measure, indeed, throughout the neighbourhood, the event was considered as a general calamity. Some of the underwriters on the Esk, I was informed, had offered 60 *per cent.*, for the re-assurance of the sums for which they were liable; but such was the nature of the risk, as ascertained from the information of some ships' crews by whom we had been assisted, that no one would undertake the re-assurance even at this extraordinary premium.

The hearty congratulations I received on landing, from every acquaintance, were almost overwhelming; and these, with the enhanced endearments of my affectionate and enraptured wife, amply repaid me for all the toils and anxieties of mind that I had endured.

On the tide ebbing out, the Esk was left dry; on which, for the first time since the accident, the whole of the water was drawn out of the hold by the pumps. The next tide, the ship was removed above the bridge, to a place of perfect safety, where,

the pumps being neglected, the water, in the course of two tides, rose nearly as high within as without. After the cargo was discharged, the ship was put into dock; and it was found, that excepting the loss of 22 feet of keel, left in Greenland, and the removal of a piece of the starboard garboard-strake, 9 feet in length, with a portion of dead-wood brought home upon deck, no other damage of consequence had been produced by the ice. The main piece of the rudder, indeed, was found to be sprung; all the rudder works under water, excepting the lowest band, broken; and the stern-post shaken loose: but these injuries were chiefly sustained when the ship was driven into the ice on the 1st of May. The whole expence of repairs did not, I believe, exceed 200 *l.*

Though the sacrifice of nearly one-half of our cargo, was a considerable disappointment to the owners, who had been apprised of our success in the fishery, yet, when compared with the salvage which might have been demanded, had no contract been entered into for the assistance of the John, the sacrifice appeared to have been a material benefit, having been productive of the saving of perhaps 2000 *l.* The approbation of my conduct by the owners, Messrs Fishburn and Brodrick, was testified, by their presenting to me a gratuity of 50 *l.*; and the sense entertained by the Whitby underwriters of the preservation of the ship, was pleasingly manifested, by a present of a handsome piece of plate.

I may add, in conclusion, that the whole of my crew, excepting one individual, returned from this adventurous and trying voyage in safety; and, in general, in a good state of health. Several of the men, indeed, were affected, more or less, by the excessive fatigue, and by the painful exposure to cold and damp while resting on the ice; but all of them were, in a great measure, restored, before our arrival at home, excepting one man; he, poor fellow, being of a weak constitution, suffered severely from the inclement exposure, and died soon after he arrived in port.

APPEN-

APPENDIX

TO

VOLUME SECOND.

APPENDIX.

No. I.

AN ABSTRACT OF THE ACTS OF PARLIAMENT AT PRESENT IN FORCE FOR THE REGULATION OF THE WHALE-FISHERIES OF GREENLAND AND DAVIS' STRAITS.

Ships fitted out for and returning from the northern whale-fisheries, are entitled to a certain bounty, on the condition of all the requirements of law being fulfilled by the different persons connected therewith; and, under certain conditions and restrictions, are at liberty to import into Great Britain, &c. any of the produce of whales, or other creatures caught in the Greenland Seas or Davis' Straits, not actually free of duty as formerly, but subject only to a small impost; but in default of compliance with such conditions and restrictions, the produce so imported will be chargeable with the duties imposed on the blubber, oil, fins, &c. of foreign fishing, which are very heavy.

The substance of the acts of Parliament at present in force relative to, and for the government of, the northern whale-fisheries, is comprised in the following Abstract.

By the 26th Geo. III. c. 41. (which may be considered as the fundamental act relative to the Greenland and Davis' Straits whale-fisheries), amended, extended, altered, and continued by various subsequent acts of Parliament until the 25th March 1820 *, it is enacted, That every British built vessel, owned

* 55th Geo. III. c. 39. §. 1. expected to be again extended.

by British subjects, usually residing in Great Britain, or in the islands of Guernsey, Jersey, or Man, which shall, within the time herein limited, proceed from any port of Great Britain, or the islands aforesaid, on the whale-fishery to the Greenland Seas or Davis' Straits, or to the seas adjacent, and which shall be manned and navigated with a master, and three-fourths of the mariners at least, being British subjects, shall, before she proceeds on such voyage, or be entitled to the benefits of this act, be visited by the proper officer of the Customs belonging to such port, who shall examine such vessel, and take an account of the tonnage thereof by admeasurement, and shall certify such his visitation, examination, and admeasurement, to the Commissioners of his Majesty's Customs *; and if it appears by the certificate that she hath on board such a number of men, provisions, boats, fishing-lines, and instruments to be used in such fishery, as herein after mentioned; that she is strongly built, and otherwise a proper ship for such voyage and fishery, and hath on board, among her crew, a sufficient number of harpooners, steersmen, and line-managers, who have before been employed in such voyages, (the names of such persons to be contained in such certificate); and if it further appears, by the oath of one or more owner or owners †, and of the master or chief officer of such vessel, written at the foot of such certificate, and made before the principal officers of the Customs of such ports, or any two of them, whereof the Collector shall be one, that it is their firm purpose and determined resolution that such ship shall, as soon as license shall be granted, proceed, so manned and furnished, "on a voyage to the Greenland seas or Davis' Straits, or the seas adjacent, and there, in the then approaching season, to use the utmost endeavours of themselves, and their ship's

* For the rules given by the Commissioners of the Customs for the government of the surveying officer, vide Appendix No. IV. art. 1.

† "Owners, in case of sickness, or unavoidable absence, may take the oaths required before the sailing of the ship, before a Justice of the Peace, affidavit of which shall be accepted, and deemed as effectual as if the owner or owners had conformed to the said act."—42d Geo. III, c. 22. § 4.

company, to take whales or other creatures living in the sea, and on no other design or view of profit in such voyage, save and except any reward or rewards offered by any act of Parliament, for more effectually discovering the longitude at sea, or encouraging attempts to find a northern passage between the Atlantic and Pacific Oceans, and to approach the northern pole *, and to import the whale-fins, oil, and blubber thereof, into the kingdom of Great Britain," (naming the port); and if the master, after such certificate had and oath made, do also become bound, with two sufficient securities, in the penalty of a sum equal to treble the bounty †, (which bond is to be in force for three years, for the faithful dealings of the said master and ship's company in regard to the said ship and voyage,) then, it shall be lawful for any three or more of the Commissioners of the Customs in England and Scotland respectively, on receiving such certificates and oaths made, and it being certified by the Collector and Comptroller of such port that security hath been given, to grant, and they are hereby required to grant, to the master and owners of such ship, full licence to proceed on her voyage.—26th Geo. III. c. 41. § 1.

Every ship, which shall be deemed duly fitted, and properly qualified for the whale-fishery, if of the burthen of 200 tons, shall have on board 40 fishing-lines of 120 fathoms each, 40 harpoons, 4 boats, with 7 men at the least (including an harpooner, a steersman, and a line-manager,) to each boat, making in the whole 28 men ‡, besides the master and sur-

* 58th Geo. III. c. 15. § 2.

† For the conditions of this bond, vide Appendix No. IV. art. 3.

‡ Hence the number of the different classes of persons in the crew, and quantity of stores in the outfit, as required by this act for ships of different dimensions, are as follow:

Tonnage of Ships.	Harpooners	Boat-steerers	Line-men	Seamen.	Greenmen	Apprentices	Total including Master & Surgeon.	N° of Boats.	Fishing lines.	Harpoons
150 and under 200,	3	3	3	7	3	3	24	3	30	30
200 ——— 250,	4	4	4	8	4	4	30	4	40	40
250 ——— 300,	5	5	5	9	5	5	36	5	50	50
300 and upwards,	6	6	6	10	6	6	42	6	60	60

geon, with six months provisions * at the least for such number of men; and every ship of larger burthen, an increase of 6 men, 1 boat, 10 such lines, and 10 harpoons more, for every fifty tons above 200, (as high as 300), together with provisions in proportion, [42d Geo. III. c. 41. § 2.] And every such ship employed in the said fishery, shall have on board apprentices indentured for three years at least, who shall not exceed the age of 20 years, nor be under 12 years of age, at the time they shall be so indentured, in the proportion of one apprentice for every fifty tons burthen, [32d Geo. III. c. 22. § 3.]; and one fresh or green man for every fifty tons burthen; which apprentices and green men shall be accounted in the number of men required to be on board. —26th Geo. III. c. 41. § 2.

No bounty shall be allowed, unless there be inserted in the indenture of each apprentice the name or names of the vessel or vessels on board of which he is bound to serve, or to which he may have been turned over, [29th Geo. III. c. 53. § 7.]

In case the time for which any apprentice shall have been indentured, shall expire during the voyage, such apprentice shall be accounted and considered as an apprentice for the whole voyage, and shall, on his return from the fishery, be mustered accordingly. But no apprentice shall be deemed a legal apprentice, unless he be a subject of his Majesty.—32d Geo. III. c. 22. § 7, 8.

Vessels that are not provided with their complement of men at the port whence they clear out, may proceed, for the season, to any of the ports in the Frith of Clyde, or in Loch Ryan, or to Lerwick in the Isles of Shetland, or to Kirkwall in the Orkneys, and complete their number there, provided the number wanted doth not exceed three common men for every fifty tons burthen. On their return, those men may be set on shore where they were taken on board; and, upon producing a certificate thereof from the Collector and Comptroller of the Customs, and the master and mate making oath thereof, such ships shall be deemed to have had their full

* The quantity of provisions is left to the discretion of the mustering officer.

complements from their clearing port; and be entitled to bounty *.—46th Geo. III. c. 9.; 55th Geo. III. c. 39. § 2.

On the return of such ship to the port of Great Britain, declared before sailing, the proper officers of the Customs at such port, shall immediately repair on board, and view the condition of such ship and her lading, and certify the same, together with their observations thereon, as also the real tonnage of the said ship; and also take an account or schedule of the names of the master, mate, and other persons on board, distinguishing the harpooners and persons more immediately employed in the said fishery, and to certify the same; and the master and mate shall make oath before two of the principal officers of the Customs, whereof the Collector shall be one, that they did, in pursuance of the licence, (mentioning the day of their departure), proceed on a voyage directly to the places foresaid, and have not since been on any other voyage, or pursued any other design or view of profit, save and except any reward or rewards offered by any act of Parliament, for more effectually discovering the longitude at sea, or encouraging attempts to find a northern passage between the Atlantic and Pacific Oceans, and to approach the northern pole; and that they did there (mentioning the time of their stay in those seas) use the utmost endeavours of themselves and ship's company, to take whales, and other creatures living in those seas; and that all the whale-fins, oil and blubber, imported (if any) in such ship, were really and *bonâ fide* caught and taken in the said seas, by the crew of such ship or vessel only, or with the assistance of the crew of some other British built ship or vessel, licensed for that voyage, pursuant to the directions of this act, which oath shall be indorsed on, or annexed to, the licence aforesaid; and the said schedule, certificate, licence, and oath, shall be transmitted by the Collector and Comptroller of such port to the respective Commissioners for that part of Great Britain where such ship shall arrive; and such Commissioners being

* This privilege was limited by the act of 46th Geo. III. c. 9. to the time of the duration of the war; but was revived and continued by the 55th Geo. III. c. 39. § 2., until the 25th of March 1820.

fully satisfied of the faithful dealings of the master and other persons employed in such vessel, with respect to such voyage and fishery, shall, on demand, cause payment to be made to the master or owners, of a bounty or premium of 20s. * *per* ton, according to the admeasurement of every such ship or vessel, duly certified as aforesaid.—26th Geo. III. c. 41. § 3.; 32d Geo. III. c. 22. § 2.

The Commissioners of the Customs in England and Scotland, respectively, shall order the said bounties to be paid out of any monies that shall be in the hands of the respective Receivers-General, arising from any of the duties and revenues under their management.—26th Geo. III. c. 41. § 6.

No ship or vessel which shall not, before the 25th of December 1786, have been employed in the said fishery, although such ship or vessel be above 300 tons † burthen, shall be entitled to a larger bounty than a ship or vessel of 300 tons would be entitled to, [26th Geo. III. c. 41. § 8.] But the owner or owners of any vessel above the burthen of 300 tons, shall not be obliged to fit out, equip, and man any such ship, otherwise than as a ship of 300 tons, in order to entitle him or them to the bounty.—26th Geo. III. c. 41. § 9.

And whereas it hath been found by experience, that ships of 150 tons burthen are fit for the said fishery, every owner or owners of any ship of 150 tons, therefore, which shall be employed in the said fishery, who have conformed themselves, in proportion to their tonnage, to the rules and directions prescribed to the owners of ships of greater burthen, shall be entitled to the said bounty, according to the admeasurement of

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* At the time of passing the act 26th Geo. III. the bounty was 30s. *per* ton; but in 1792, by act 32d Geo. III. c. 22. it was reduced to 25s., and, after the year 1795, to 20s. by the same act.

† Ships employed in the fishery at the time of passing this act, (1786), if above 400 tons burthen, were entitled to a bounty of 400 tons; and in case such ships were not worn out, they were to enjoy the same until the 25th of December 1791, [26th Geo. III. c. 41. § 8.] And such ships were not required to be fitted out otherwise than as ships of 400 tons, in order to entitle them to the bounty.—*Ibid.* § 9.

every such ship, provided such admeasurement be not less than 150 tons.—26th Geo. III. c. 41. § 7.

No person shall be entitled to receive the bounty for any ship which shall proceed upon the said whale-fishery, from any port of Great Britain, or the islands of Guernsey, &c. unless such ship shall sail from the port where she shall be surveyed and cleared, directly on her intended fishery, on or before the 10th day of April in each year, and shall continue with her crew in the Greenland seas, or Davis' Straits, or the adjacent seas, diligently endeavouring to catch whales, or other creatures living in those seas, and shall not depart from thence before the 10th day of August next following *, unless such ship, if she be of the burthen of 300 tons, shall be laden with 30 tons of oil, or blubber in proportion thereto, the blubber to be rated, with respect to the oil, as three to two, and one ton and a half of whale-fins; or if she be of greater or less burthen, with a quantity of oil or blubber, and whale-fins, in like proportion to the tonnage for which every such ship shall be entitled to the bounty, being the produce of one or more whale or whales, caught by the crew thereof, or with the assistance of the crew of some other licensed ship, before that time, or shall be forced by some unavoidable accident or necessity, to depart sooner from those seas; which accident or necessity shall be verified on the oaths of the master and mate belonging to such ship, upon her return from the said fishery, before the Collector and another principal officer of the Customs, at the port where she shall arrive, who shall transmit the same, together with the schedule, licence, and other documents, to the Commissioners of the Customs for that port of Great Britain where such ship shall arrive.—26th Geo. III. c. 41. § 4.

The owners of any vessel sailing on the whale-fishery of Greenland or Davis' Straits from Great Britain, or the islands of Guernsey, &c. which shall proceed from the port where she was surveyed and cleared out, directly on her intended

* See the next following paragraph, where this limit is modified.

voyage on or before the 10th of April each year, shall be entitled to the bounty, although she have not taken the quantity of oil specified in the foregoing act, (namely, 26th Geo. III. c. 41.) if it appear by her log-book that she had continued in the said seas, diligently endeavouring to catch whales, or other creatures living therein, and did not depart from thence until the expiration of sixteen weeks from the time of her sailing from the port where she was surveyed and cleared out, provided she has not touched at any other port in the voyage, and have complied with all the other regulations of the said act.—29th Geo. III. c. 53. § 2.

In case it shall happen, that any ship or vessel shall not sail from the port where she was surveyed and cleared, on or before the said 10th day of April, provided it shall be made appear, to the satisfaction of the Commissioners of the Customs in England and Scotland respectively, that such ship was properly qualified and duly fitted out, and surveyed, cleared, and ready for sailing before the said 10th of April, but was prevented from sailing by some unavoidable impediment, but shall actually have sailed on or before the 25th day of April, it shall be lawful for the said Commissioners, or any four or more of them in England, or any three or more of them in Scotland, to pay the bounty for such ship, in like manner as if the said ship had actually sailed on or before the 10th day of April.—26th Geo. III. c. 41. § 5.

No bounty shall be paid to any person or persons whatever, on account of any ship employed in the said fishery, unless a log-book shall have been constantly kept on board, in which log-book the various situations and occurrences respecting such ship, during the whole course of the voyage, shall be inserted every day, and particularly the times when such ship shall have been in sight of land, distinguishing what land, and the bearings thereof, and the supposed distances therefrom, and the soundings; and also the times when, and the latitude in which, any whale, or other creature living in the sea, shall have been killed, taken, or caught by the crew of such ship; which log-book shall be delivered by the master, or other person having the command of such ship, at the

time of his making a report, to the Collector of the Customs, at the port in Great Britain where such ship shall arrive on her return from the said fishery, for his inspection and examination; and the said master, or other person having the command of such ship, together with the mate thereof, shall jointly and severally verify on oath the contents of such log-book before such Collector.—26th Geo. III. c. 41. § 10.

In case any such ship shall fall in with any of his Majesty's vessels of war, the master, or other person having the command of her, shall produce to the Captain, or other officer commanding such vessel of war, the said log-book, and such Captain or commanding officer shall make a memorandum in such log-book, of the day in which it was so produced to him, and shall subscribe his name thereto, and also make an entry in the log-book of the said vessel of war, of the name and description of such ship on board of which the log-book so produced to, and signed by him was kept; and in case such ship, on board of which a log-book is so required to be kept, shall put into any foreign port, where there is a British Consul, or other chief British officer, the master, or other person having the command of such ship, shall produce such log-book to such British Consul, or other chief British officer, who shall make a memorandum therein, of the day on which it was so produced to him, and shall in like manner subscribe the same.—26th Geo. III. c. 41. § 11.

Every ship owned by his Majesty's subjects residing in Ireland, and fitted out from any port in that kingdom, which shall have complied with the conditions of this act, to be verified by certificates, in such manner, and under like rules, regulations, and restrictions, as are required by any law in force before the passing of this act *, to entitle ships or vessels fitted out from Ireland to the bounties then existing for the encou-

* 15th Geo. III. c. 31. § 21. contains the regulations for visiting and licensing, by the revenue-officers in Ireland, vessels fitted out from thence for the bounties then existing. The regulations are similar to those practised in Great Britain, and the vessels are required to import their whale-fins, oil, and blubber, into some port of Great Britain, to be previously named.—*Jickling's Digest of the Laws of the Customs.*

ragement of the Greenland and Davis' Straits whale-fishery, shall be entitled to the same bounties as the like ships or vessels fitted out from Great Britain.—26th Geo. III. c. 41. § 12.

It shall be lawful for the owner of any ship employed or designed to be employed in the said fishery, to insure the bounty which such owner would be entitled to upon the return of such ship to her proper port; and on the performance of all other matters directed and appointed to be performed for obtaining the said bounty.—26th Geo. III. c. 41. § 13.

Whale-fins, oil, or blubber of whales, seal-oil, or seal-skins, or any other produce of seals, or other fish or creatures taken or caught in the said Greenland seas or Davis' Straits, or in the seas adjacent, by British subjects usually residing in Great Britain or Ireland, or the islands of Guernsey, Jersey, Alderney, Sark, or Man, in British built ships or vessels, owned and navigated as before required, in regard to the bounties, shall and may be imported into Great Britain, without paying any custom, subsidy, or other duty for the same *, excepting only the duties imposed on articles of British fishing, by consolidation act of the 49th Geo. III. c. 98. Table (A), inwards †.

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* Thus far the original act of 26th Geo. III. c. 41. § 14. continues in force, subject only to the annexed exception. For the oath required by the next section of this act, that the cargo was caught by the crews of such ships, other proof is substituted, as stated in act 49th Geo. III. c. 98. § 37.

† Under the regulations of the act 26th Geo. III. c. 41. whale-fins, oil, or blubber of whales, seal-oil, or seal-skins, &c. were permitted to be imported free of duty; but in the year 1797, a duty of 16s. 10d. *per* ton was laid on "train-oil, or blubber, fish-oil, or oil of seals, or other creatures living in the seas, not otherwise enumerated or described" by the Tonnage-duty act, 38th Geo. III. c. 76. Table (A) inwards. And upon other produce of the fisheries, such as whale-fins, skins, &c. because not particularly enumerated or described, a duty of 3 *per cent.* was imposed by the same act. This act, by which blubber and oil were equally charged, though these articles bear a proportion to each other as 3 to 4 nearly, was amended by 39th and 40th Geo. III. c. 51. § 1. whereby blubber was permitted to be boiled into oil, under the inspection of the proper officers, and such oil admitted to entry, and the duty paid thereon. An alteration seems to have been intended to be made by 42d Geo. III. c. 43. Table (A) inwards; but the Consolidation Act of the 43d Geo. III. c. 68. being passed so soon after

Whale-fins, oil, or blubber of whales, seal-oil, or seal-skins, or other fish, &c. caught in any part of the ocean by British subjects, usually residing in Great Britain or Ireland, or islands of Guernsey, &c. in ships built in either of the said kingdoms or islands, owned, registered, and navigated according to law, although *not* fitted out in other respects so as to be entitled to the bounty, may be imported into Great Britain, without paying any duty, (excepting the duties of the consolidation act of the 59th Geo. III. c. 52. subsequently imposed); provided proof be made that the said articles were actually caught by the crew of the said vessel importing them,

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it, on which new duties were laid on Greenland produce, the former appears not to have been generally enforced.

By consolidation act of 49th Geo. III. c. 98. Schedule (A) inwards, a "permanent duty" of 5s. 3d. *per* ton, and a "war duty" of 1s. 9d. were laid on train-oil of British fishing, imported in British built vessels, owned, registered, and navigated according to law. The war duty on Greenland and Davis' Strait produce, was continued after the peace until the year 1816, when it was made permanent by act 56th Geo. III. c. 29. § I. And an addition of one-fourth to the original permanent custom-duties, was ordered to be levied by act 53d Geo. III. c. 33., by which the whole duty on train-oil of British fishing was increased to 8s. 3¾d. *per* ton.

The duties now leviable on the produce of the fisheries of Greenland and Davis' Strait, as enumerated in the last Consolidation Act of 59th Geo. III. c. 52. Table (A) inwards, are as follow:

"Blubber, the produce of fish, or creatures living in the sea, taken and caught by the crew of a British built ship or vessel, wholly owned by his Majesty's subjects, usually residing in Great Britain, Ireland, or the islands of Guernsey, Jersey, Alderney, Sark, or Man, registered and navigated according to law, and imported in any such shipping, the ton, containing 252 gallons,	L.	0	5	6
"Train-oil, the produce of fish," [as above,] *per ton*,		0	8	3
"Whale-fins, taken and caught," &c. [as above], *per ton* of 20 cwt.		2	7	6
"Blubber, the produce of fish or creatures living in the sea, of foreign fishing, the ton, containing 252 gallons,		22	3	4
"Train-oil, of foreign fishing, *per* ton,		33	5	0
"Whale-fins, of foreign fishing, the ton, containing 20 cwt.		95	0	0
"Bear skins, undressed, imported in a British built vessel, *per* skin,		0	4	6
"Seal skins, undressed, imported in a British built vessel, *per* skin,		0	0	3
"Skins and furs, undressed, not particularly enumerated or described, or otherwise charged with duty, *per cent. ad val.*		75	0	0

by oath of the master, and provided a log-book be kept in the usual way.—32d Geo. III. c. 22. § 4.

Before any blubber, train-oil, or spermaceti-oil, or head matter, or whale-fins, imported into Great Britain, being the produce of fish or creatures living in the sea, taken by the crew of a British built vessel, wholly owned by his Majesty's subjects, usually residing in Great Britain or Ireland, Guernsey, Jersey, Alderney, Sark, or Man, registered and navigated according to law, shall be admitted to entry, on paying the duties imposed by this act, on such blubber, train-oil, &c. imported in such ship; the shipmaster, or other person having the command, shall make oath before the chief officer of the Customs at the port into which the same shall be imported, that the same was *bonâ fide* the produce of fish, &c. actually caught by the crew of any such vessel: and the importer, proprietor, or consignee of such blubber, &c. shall also make oath before such officer, at the time of the entry, that, to the best of his knowledge and belief, the articles so imported were *bonâ fide* the produce of fish, &c. actually taken by the crew of a British built vessel, wholly owned by his Majesty's subjects, usually residing in Great Britain, Ireland, &c. registered and navigated according to law; on failure whereof, such articles shall be deemed and taken to be foreign fishing, and charged with the duties imposed on such articles of foreign fishing.—49th Geo. III. c. 98. § 37.

If any person or persons shall grant any false certificate for any of the purposes required or directed by this act, such person or persons shall forfeit the sum of L. 500; and if any person or persons shall counterfeit, erase, alter, or falsify any certificate required or directed by this act, or shall knowingly make use of any false certificate, or of any certificate so counterfeited, erased, altered, or falsified, such person or persons shall, for every such offence, forfeit the sum of L. 500, and every such certificate shall be invalid, and of no effect.—26th Geo. III. c. 41. § 16.

No *harpooner, line-manager,* or *boat-steerer,* who shall be in or belong to any vessel in the Greenland fishery trade *, and whose name (distinguishing the capacity in which he is to serve) shall be inserted in a list, delivered on oath by the owner of the vessel to the Collector of the Customs at the port from which she is to proceed on the fishery, shall be *impressed* from the said service; and such harpooner, boat-steerer, or line-manager, may, when not employed in the said fishery, sail in the *colliery* or *coasting*† trade, upon giving security‡ to the satisfaction of the Commissioners of the Customs, that he or they will proceed in the said vessel to the Greenland seas, or Davis' Straits, on the whale-fishery, the next season; and every *seaman* or *common mariner* who shall be entered to serve on board any vessel intended to proceed on the said fishery, whose name shall be inserted in a list, to be delivered as aforesaid, and who shall have given security to proceed accordingly, shall be exempt from being impressed out of the said service from the 1st of February each year, until the voyage home from thence shall be fully complete and ended, and no longer. (26th Geo. III. c. 41. § 17.) Provided always, that this act shall not extend to protect from the impress any greater number of officers than six harpooners, six boat-steerers, and six line-managers, belonging to each vessel of the burthen of 300 tons, and so in proportion of every vessel of *smaller* burthen; one harpooner, one boat-steerer,

* By act 32d Geo. III. c. 22. § 5. harpooners, boat-steerers, line-managers and seamen belonging to vessels *not* fitted out under the regulations of the acts which would entitle them to the bounty, are protected from the impress, on the same conditions relative to oaths and securities, as those fitted out under the bounty acts, but with the proviso, that the act do not extend "to protect from the impress more than 6 harpooners, 6 line-managers, 6 boat-steerers, and 18 common mariners, belonging to each such vessel of 400 tons burthen, and so on in proportion for any less tonnage."

† In the original act, the word *coasting* is omitted; but it was introduced in act 31st Geo. III. c. 43. and has since been perpetuated.

‡ For the conditions and nature of this security, vide Appendix No. IV. art. 4.

and one line-manager less for every 50 tons smaller burthen*. —42d Geo. III. c. 22. § 2.

The Greenland Seas and Davis' Straits, and seas adjacent, within the intent and meaning of the bounty acts, shall be deemed and taken to extend to the latitude of fifty-nine degrees thirty minutes north, and no farther.—26th Geo. III. c. 41. § 18.

No whale-boat belonging to any whale-fishing ship employed in the above fishery or in the seas to the south thereof, shall be liable to seizure on account of her built, dimensions, or construction; but on the return of such ship from the fishery every season, such boat shall be laid up by the owner or owners thereof in such place or places as shall be approved of by the principal officer of the Customs of the port at which such ship shall arrive, and shall not be employed or made use of in any way whatever, but in the said fisheries. —32d Geo. III. c. 22. § 6.

If the master of any vessel, or any other person, to whom any apprentice shall be indentured, pursuant to act 26th Geo. III. c. 41. shall suffer him to leave his service (except as herein after provided) before the end of the term for which he is bound, such master, or other person, shall forfeit, for each offence, fifty pounds, to be recovered by action of debt, &c. in any of his Majesty's courts of record. [29th Geo. III. c. 53. § 5.] Not to extend to any case where an apprentice is legally discharged before a Magistrate, or turned over from one person to another concerned in the said fisheries, to serve the remainder of his time in the said fisheries, pursuant to the said act.—29th Geo. III. c. 53. § 6.

Spermaceti-oil, head-matter, train-oil, and all other fish-oil, blubber, and whale-fins, of British fishing, imported at Lon-

* As neither this nor the fundamental act, (26th Geo. III.), limits the number of seamen to be protected during the voyage, it has become a practice with the Officers of Customs to assume the number of common seamen required by law to be on board each ship, (26th Geo. III. c. 41. § 21.), as the amount to be protected; that is, 16 men in a ship of 300 tons or upwards, and two men less for every fifty tons smaller burthen.

don * (not by the East India Company, or from the West Indies), may be landed and secured in approved warehouses, without the duties being first paid.—43d Geo. III. c. 132. § 4. and 5. Table D.

The Commissioners of the Customs for England and Scotland respectively shall, at the beginning of every session of Parliament, lay before both Houses of Parliament, an account, in writing, of what number of vessels have been employed in the whale-fishery to Davis' Straits and the Greenland Seas, with their respective names and burthens, from whence they were fitted out, and at what port in Great Britain they were discharged; and also what quantity of oil or blubber, or whale-fins, each ship or vessel shall have imported.—26th Geo. III. c. 41. § 19.

One moiety of the penalties inflicted by this act shall be to the use of his Majesty, and the other moiety to such Officer or Officers of the Customs as shall sue for the same.—26th Geo. III. c. 41. § 20.

If any action shall be commenced against any person or persons for any thing done in pursuance of this act, they may plead the general issue, and give this act and the special matter in evidence that the same was done by authority of this act: And if it shall appear so to have been done, then the jury shall find for the defendant or defendants; and if the plaintiff shall be nonsuited, &c. the defendant or defendants shall recover treble costs.—26th Geo. III. c. 41. § 21.

* This indulgence may, by Order in Council, be extended to any other port. —43d Geo. III. c. 132. § 10.

No. II.

1. SOME REMARKS ON THE MOST ADVANTAGEOUS DIMENSIONS OF A WHALE-SHIP.

It has been remarked (page 189 of this volume), that perhaps a roomy ship of 330 or 340 tons burden, possesses more advantages, in the whale-fishing, with fewer disadvantages, than a vessel of similar build of any other capacity. It may be useful to examine the truth of this proposition.

In the most favourable and prosperous cases, a ship of 330 tons burden may receive on board about 150 tons of blubber at once; a ship of 250 tons scarcely 100. Hence, being soon crowded with blubber, the smaller ship is not capable of deriving the same advantage from any extraordinary "run of fish" as the larger; the fishing is necessarily suspended, until the blubber obtained is packed in casks, an operation requiring so much time, that a favourable opportunity, such as a run of fish, rarely continues until it is completed, nor often recurs in one season. But as the larger vessel might, on such an occasion, have obtained 50 tons of blubber more than the smaller, before it would be necessary to "make off," the advantage in the fishery would, of course, be highly in her favour. Besides, with the most successful issue, the cargo of a small ship must necessarily be such, that her profits, under all circumstances, must be comparatively moderate.

Though the cargoes of a large and small ship, when filled, may be in proportion to their tonnage, yet neither the profits nor advances are in the same proportion. For since a ship of 330 tons may, if required, be navigated with the same crew, and fitted for the fishery at the same expence of stores as one of 250 tons; the principal point in which the expences of the larger will exceed those of the smaller, will be in the matter of first cost. Now, the difference in the first cost

of two new ships of 250 and 330 tons will be about 1600*l.*; the extra interest of capital, insurance, and wear and tear, on which may be stated at 150*l. per annum.* Therefore reckoning the average value of oil to the whale-fishers at 27*l. per* ton, (7*l.* being deducted for paying the premiums of the master and seamen on the oil, with expences of extracting it, &c.) the larger ship, to return the same profits to the owners as the smaller, will require a cargo of $5\frac{1}{2}$ tons of oil each voyage more than that of the smaller; but every ton of oil she procures above that quantity in excess, will be equal to 27*l.* advantage to the owners. Supposing, then, the two ships to get full cargoes, the larger will carry about 240 tons, and the smaller about 160, the difference of which is 80 tons; this, reckoned at 27*l. per* ton, expences in premiums and manufacture being deducted, amounts to 2160*l.*, the additional profit in favour of the larger vessel. This advantage, however, can only be casual; yet it is so considerable, that when connected with the first mentioned advantage of profiting to a greater extent on meeting with a "heavy run of fish," together with the superior comfort and convenience afforded in large vessels, it becomes a benefit of much greater moment than the excess of expences with which it is obtained; consequently these considerations appear to warrant the equipment of vessels of 330 or 340 tons, in preference to any of smaller dimensions, on the ground of their superiority in point of adaptation, and advantage to the proprietors.

As a roomy vessel of 330 or 340 tons will contain as large a cargo as can generally be obtained, even in the most favourable season, it is probable that a much further increase of tonnage would be almost useless; and if so, it must be obtained at a real expence and disadvantage. How far, however, a moderate increase or diminution of tonnage might be made, without becoming unprofitable, must be a matter of opinion and uncertainty.

2. Further notices respecting the fortifications of a Greenland ship.

[See p. 191.]

A plan for the internal fortifications of a whale-ship, adopted by Messrs Hurry and Gibson in the fitting out of the Lady Forbes from Liverpool, and, since then, applied to a new ship built by Messrs Mottershead and Hays of that port, seems to possess some advantages over that described in Chap. iv. sect. 1. of this volume, and, it appears to me, ought therefore to be noticed. The new ship, which is intended to be put under my command, is of a very superior and substantial build, and is fortified within the bow in the manner following:

The breast-hooks, five in number, are 12 inches square, and about 12 feet in length, and are placed 12 inches asunder. All the breast-hooks are extended by an horizontal timber applied to each end, and every space is filled up with four similar timbers, (a little slighter), while three horizontal ranges of timber of a similar kind are placed beneath the lowest of the breast-hooks. These altogether form a solid bed of timber, extending from the hold-beams downward to the foot of the apron, and occupying the whole interior of the bows to the distance of 17 feet on each side of the stem. This part of the fortifications intersects, in the direction of its timbers, the square-frames and cant-timbers of the bows nearly at right angles, and each hook, intermediate timber and pointer, is bolted with copper into every frame which it intersects. Across this horizontal range of the fortifications are placed 7 riders, extending from the hold-beams down to the lowest pointer; one rider is in the centre, corresponding, in position, with the stem, another crosses the ends of all the pointers, and two more on each side are placed at equal intervals between those in the extremes and in midships. Near about the centre of the circle, of which the bows at the height of the hold-beams are arcs, is fixed a square perpendicular timber called a *king-post*, of the diameter of 18 or 19 inches

each side, and extending from one of the hold-beams to the kelson. This post is convex on the fore part, presenting an arch towards the stem, and receives the interior ends of the shores, twenty-eight in number, fixed against the riders. It is supported abaft by two beams, of 12 inches square, one $2\frac{1}{2}$ feet, the other 5 feet below the hold-beams, which are securely fastened by knees to the timbers in the bows. As the king-post occupies a central position with regard to the bows of the ship, the shores being set in close order between it and every rider, become radii of the circle of which the water-line of the bows forms the circumference. Hence, whenever a blow is received on any part of the bow, the shock is communicated by the shores directly to the king-post, and from thence dispersed throughout every part of the fortifications with whic h it is connected.

No. III.

[Referred to in p. 199.]

SCHEDULE OF THE PRINCIPAL FISHING APPARATUS NECESSARY FOR A SHIP OF THREE HUNDRED TONS BURDEN OR UPWARDS, INTENDED TO BE EMPLOYED IN THE GREENLAND TRADE.

Wood and Iron Work.

7 or 8 *whale-boats*, of 5 or 6 oars; those of five oars are the most convenient, and are usually 25 or 26 feet in length.
25 or 30 pairs of pulling *oars*, 14 to 16 feet in length.
6 or 8 pairs of steering *oars*, 18 to 20 feet in length.
60 *harpoons*.
40 *lances*.
20 *boat-hooks*.
2 or 3 dozen *seal clubs*.
7 or 10 *splicing-fids*.
7 or 8 boat-*axes*.
7 or 8 *grapnels*.
2 or more boat-*winces*.

7 boat *jacks* or *flags*.
2 or more boat *compasses* (wood-bowls).
7 blowing-*horns*?
7 or 8 *tail-knives*.
8 or 10 *blubber*-knives.
10 to 15 *strand*-knives.
3 or 4 whale-*bone* knives.
1 *blubber cutting apparatus*, or 7 *chopping* knives.
6 *gumming*-knives.
8 or 10 *seal* and *krenging* knives.
3 or 4 *krenging-hooks*.
6 *steels*.
12 *blubber-spades*.
2 (whale)-*bone spades*.
6 or 8 *prickers*.
6 or 8 *king's forks*.
10 or 12 *pick-haaks*.
2 pairs of *hand-hooks*; or more.
7 pairs of *spurs*.
3 or 4 pairs of *T's and claws*, or sets of *bone-gecr*.
2 (whale)-*bone handspikes*.
6 iron *closhes*.
2 to 4 *ice-poles*, 24 feet in length.
1 *ice-anchor*, 100 lb. in weight.
1 ditto, 75 lb.
2 ditto, 50 lb.
2 ditto, 30 lb.
1 *bay-ice* anchor, 25 lb.
2 *ice-grapnels*.
6 *ice-axes* or *ice-drills*.
1 *ice-saw*, 12 or 14 feet in length.
2 ditto, with moveable backs, 6 and 9 feet.
1 *harpoon-gun*, or more.
1 *flensing wince*, or extra *capstern*.
1 *armourer's forge*.
2 pairs of *cant-hooks*.
1 pair of *chain-slings* for casks.

1 *lull iron.*
1 *speck trough*, with supporting screws for the lid *.
1 *harpoon* chest, about 6 feet long, 2½ broad, and 2¼ deep.
4 or 6 *blubber-pumps* †.
1 or 2 *grindstones.*
280 to 300 tons of *casks*, of sizes suitable for stowage.
A quantity of *hoop-iron* and *rivets.*
A set of *cooper's tools.*
A set of *armourer's tools*, including *files.*
Bungs; spare staves; stave-ends for buckets and speck-tubs, &c.
Rickers, poles, or other wood for harpoon and lance-stocks; handles of knives, spades, prickers, pick-haaks, seal-clubs, ice-axes, ice-poles, boat-hooks, &c. &c. &c. and wood for tholes, &c.

Blocks and davits.

Davits or *cranes* for seven boats.
18 *boat-tackle*, threefold blocks.
12 *leading-blocks* for the above.
8 or 10 *guy*-blocks or *speck-tackle* blocks, 15 or 18 inches.
2 *leading-blocks* for speck-tackles, iron-bound.
1 large *snatch-block*, 3 inch mortice, iron-bound.
3 *kent*-blocks, 2 double, 1 single, 24 inches.
7 *boat snatch*-blocks.

Cordage.

60 *whale-lines*, 120 fathoms each.
1 *guy*, 8 to 10 inches, tapered.
Boats tackle-falls, 500 fathoms; 2½ inches.
Kent tackle-fall, 70 fathoms; 5 inches.
Speck tackle-falls, and rope for *bone-geer*, 200 fathoms; 3¼ inches.
5 or 6 *ice-hawsers* or *warps*, 80 to 120 fathoms each; from 4 to 9 inches in circumference.

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* When a blubber-cutting apparatus is used, the speck-trough, lull-iron, and chopping-knives, are scarcely needed.

† Figures of most of the above instruments are contained in Plates xviii. xix. xx. xxi. and xxii. See the last article of this Appendix.

No. IV.

MANNER OF ADMEASURING WHALE-SHIPS, AND MUSTERING THEIR CREWS, WITH SOME ACCOUNT OF THE AFFIDAVITS, CERTIFICATES, &c. REQUIRED BY LAW.

[Referred to p. 199.]

An Abstract of the Directions approved and transmitted by the Commissioners of Customs, for regulating the proceedings of Surveying Officers, admeasuring and examining into the State of Ships intended for the Northern Whale-Fisheries.

Rules for ADMEASUREMENT, &c.

1. The ship being aground, dry, and upright, her length is taken, from the aft side of the main stern-post, (and not from any false piece attached to it,) "on a straight line along the rabbit of the keel, to the fore part of the main-stem, by a line immediately under the bowsprit, and squared to the line of the rabbit of the keel." This is "the length taken."

2. "The breadth is to be taken in the broadest part, outside and outside, immediately above or below the main-wales, deducting doubling, sheathing, or any extraordinary thick stuff worked thereon." This is "the extreme breadth."

3. From "the length taken" deduct three-fifths of the breadth, and the remainder is esteemed "the length of the keel for tonnage."

4. Multiply "the length of the keel for tonnage," by "the extreme breadth," and the product by half the extreme breadth, and divide the whole by 94, gives the tonnage. (This article is followed by some hints for performing the admeasurements with accuracy.)

5. To ascertain the identity of the crew on the return of the ships, the mustering officers are directed, on mustering outwards, to take down the names of the mariners, the age, where born and resident, stature and description of each according to a printed form; and if, on the return, the descrip-

tions do not correspond, the differences are to be represented to the Collector, &c. and transmitted to the Board. A duplicate of such list is to be entered "on the back of the certificate, of the ship's being properly fitted for the whale-fishery; and the owner and master's oath."

The Mode of MUSTERING Greenland-ships.

1. When the ship is completely fitted according to law, "the master or owner gives notice that she will be ready for muster on a certain day; on which the proper officers go on board, when a list of the crew is delivered to them by the master, in which is described their names and stations, and they are all ordered on the quarter-deck, close to the tafrail, when the muster begins."

2. MASTER.—"The master is called and examined very strictly, whether he has on board a sufficient quantity of good and wholesome provisions, to serve the whole crew for six months with full allowance; an account of which is given in writing, and afterwards sworn to before the collector."

3. SURGEON.—"The person nominated as surgeon is next called, and strictly examined as to his abilities and qualifications; if he produces certificates, &c. of his having been regularly bred to that profession he is passed; if not, he is rejected, and another proper person is provided before the ship is suffered to clear out."

4. HARPOONERS.—"The harpooners are called and examined separately; those who have been *three* voyages in that fishery, and in the character of boat-steerers, are passed; those who have not, are rejected."

5. BOAT-STEERERS.—"Boat-steerers are examined; such as have been *two* voyages in this fishery, in the character of line-managers, are admitted, or otherwise rejected."

6. LINE-MANAGERS.—"Line-managers are rejected unless they have been one or more voyages in the fishery."

7. GREEN-MEN.—"Green-men are admitted, whether seamen or landmen, provided they have never before been on such a voyage or fishery."

8. APPRENTICES.—" Apprentices must be above twelve and under twenty years of age when bound; and the indentures must be for three years at least. If any doubt arise as to the proper age, proof must be made by the master, producing his parochial register, or otherwise the boy is rejected. Care is taken, by examining the indentures, to see that the owners names, and the name of the ship in which they are to serve, are inserted therein."

9. " The number of lines, harpoons, boats, and other requisites prescribed by the act, are examined."

The muster-list is then made out, " certified and delivered to the collector, who thereby clears the ship outwards, and the board grants her licence to proceed on her voyage *."

" On the return, the master gives notice to the mustering officers, who go on board, order the crew upon the quarter-deck, and proceed by calling them by their names. If any have run, as is frequently the case, the person present is examined strictly as to his qualifications, and his name is placed in the list, noting in whose room he has served. The contents of the cargo is inserted in this list."

Some Account of the Affidavits, Certificates, &c. required by Law.

1. The *Certificate* of the mustering officer consists of a copy of the " muster-list," with a notification of the number of lines, harpoons, and boats on board, and a declaration of the sufficiency of the provisions,—of the vessel being strongly built, and otherwise a proper ship for such voyage and fishery,—and of there being among her crew a sufficient number of harpooners, steersmen, and line-managers, who have before been employed in such voyages. This, also including the affidavits of the owner and master, with regard to their faithful

* As the *Licence* is a matter of right, when all the papers expressive of the conditions of the law having been fulfilled, are regularly prepared, the ship is not obliged to wait until the arrival of the licence.

intentions as to the design of the voyage, is signed by the collector and comptroller of the port, and completes the "certificate of a ship's being properly fitted for the whale-fishery."

2. *Owner's and Master's Oath.*—The nature of these affidavits is very clearly defined in act 26th Geo. III. c. 41. § 1. (See third paragraph of Appendix, N° I.)

3. *Master's Bond.*—Every master of a whale-ship, before licence can be granted for the ship to proceed on her voyage, must be bound, along with two sufficient securities, of whom the owner who clears the ship is generally one, in the sum of L. 900, or treble the bounty, for the faithful dealings of himself and ship's company, in regard to the said ship and voyage.

This bond, after reciting sections 1, 2, 3, 4, 5, 7, 8, 9, & 10, of act 26th Geo. III. c. 41, &c. proceeds to the conditions of the obligation, which are such, "that if the said ship *F*, now owned, manned, and navigated, and duly qualified for the said fishery, in such manner as is, by the said act, directed and required, shall so continue during the whole voyage; and if all the whale-fins, oil and blubber, which shall be really and truly caught and taken in the said seas, by the crew of such ship only, or with the assistance of the crew of any other licensed ship, before that time, shall be imported in the said ship into some port of Great Britain; and if the said master, and his ship's company, do and shall in all respects whatsoever, conform themselves to the said act, and deal faithfully in the execution thereof, then this obligation to be void, or else to remain and be in full force, effect, and virtue.

Sealed and delivered (being first legally stamped) in the presence of
(Collector)
(Comptroller)

(Signed by the master and each security.)

4. *Protection Bonds.*—In time of war, the officers of whale-fishing ships are protected, while, on coasting-voyages,

during the intervals of each voyage to the fishery, as well as during their servitude in the ships to which they belong; and the seamen of such ships are likewise protected from the 1st of February each year, to the end of the next ensuing voyage.

Officer's Bond.—The penalty of this bond is the sum of £250. After the recapitulation of section 17. of act 26th Geo. III. c. 41. relating to the protection of officers of whale-fishing ships, the nature of the obligation of this bond, in which the officers are jointly and severally liable, is stated to be, that they shall return on board their ship "on or before the 10th of March following, and shall proceed in the said ship to Greenland or Davis' Straits, or either of them, on the said fishery;" then this obligation to be void, or else to remain in full force.

(Signed, in the presence of the Collector and Comptroller, by each of the protected officers.)

Seamen's Bond. Penalty L. 250. This bond is similar to the former. Act 26th Geo. III. § 17. being recited, the conditions of the obligation are stated to be, that if such named men shall remain on board and be employed in the service of the said ship, all and every of them, and shall proceed in the said ship to Greenland or Davis' Straits on the said fishery, then this obligation to be void, or else to remain in full force *.

5. *Master and Mate's Oath on the Ship's Return.*—In this affidavit, the act by which it is ordered (26th Geo. III. c. 41. § 3.) is so closely followed that it needs no description.

6. *Affidavit of the Truth of the Log-book.*—This is another oath administered to the master and mate. In the form of it, section 10. of act 26th Geo. III. c. 41. is closely followed.

7. *Affidavit of the Importer.*—This oath is taken before the cargo imported can be admitted to entry on the duties chargeable on the produce of British fishing, and expresses, "that all the whale-fins, oil, and blubber, imported in the

* It was, in some ports, a prevailing mistake, that the owners of the whale-ships were the bondmen of the seamen; whereas, by the nature of the bond, it is clear that both officers and seamen are alone bound for themselves and for one another.

said ship this present voyage, were really and *bonâ fide* caught and taken in the said seas (of Greenland or Davis' Straits), by the crew of the said ship only, or with the assistance of the crew of some other British built ship or vessel, licensed for this voyage, pursuant" to act of Parliament.

From the construction of this clause, any ship having received assistance in the capture of a whale from the crew of a foreign vessel, or any vessel not duly licensed, whether by accident or design, there arises a legal incapacity for claiming the bounty, or even for importing the cargo free of the foreign duties! In such cases, however, where it should be made to appear that the law was not wilfully broken, an application only to the Treasury would, probably, be necessary for restoring to the owners of the vessel their forfeited privileges. Yet the form is objectionable, from the temptation it offers to make false attestation for avoiding the risk of losing the bounty, or the trouble of making the necessary applications for obtaining it, and for getting rid of the heavy duties chargeable on the produce of foreign fishing.

The oaths required to be taken before the officers of Customs, while they are extremely painful to conscientious persons, are, perhaps, productive of no real benefit to the revenue. From their frequency, they certainly tend to make appeals to the Almighty too familiar, and reduce the solemnity of an oath into a matter of form. They have, indeed, a still more dangerous tendency. For it may be observed, that many oaths administered at a custom-house, are so worded that it is impossible to attest the truth of the whole of the points, without applying a construction to the spirit of the oath, which does not appear in the letter. Hence, it becomes a practice, almost indispensable, not to swear to the simple meaning of the words that are read, but to such a construction of them as the individual to whom they are presented may believe them capable. Thus, all that is aimed at is to avoid wilful and corrupt perjury; whilst the act of swearing to the truth of what you know nothing of, becomes occasionally ne-

cessary for the transaction of business. When once an oath loses its solemnity, perjury becomes a crime of little more weight, in the mind of a person not over scrupulous in moral duties, than the speaking of an untruth.

No. V.

ACCOUNT OF A TRIAL RESPECTING THE RIGHT OF THE SHIP EXPERIMENT, TO A WHALE STRUCK BY ONE OF THE CREW OF THE NEPTUNE *.

Gale versus *Wilkinson.*

Mr SOLICITOR-GENERAL said, this was an action of trover, to recover the value of a whale, a harpoon, a line, and a boat. The question arose out of the whale-fishery. The plaintiff was owner of a Greenland ship called the Neptune; and the defendant was owner of the Experiment, another ship in the same trade. One morning in the year 1804, perhaps much such another cold morning as this was, the two ships' boats were fishing near the North Pole. The Neptune's boat was looking out near a vast field of ice, about thirty miles in breadth, when the crew perceived a whale. The harpooner of the Neptune instantly struck the fish, which plunged, and carried with her above 1200 yards of line. The crew were determined not to lose her, and therefore kept the line fast to the boat, and suffered the whale to draw it under the ice. The crew themselves got upon the ice, and erected a flag, as a signal to the Neptune, that they had struck a fish. They knew the whale must return in a certain time to get air. The Neptune's people obeyed the signal, and sent off five boats to assist. They arrived before any of the boats of the Experiment, which were fishing at a distance, and which also came to the spot, in consequence of a signal from that ship. It happened that the whale rose with her head towards the Experi-

* For this important article I am indebted to James Gale, Esq. of Shadwell, London.

ment's boats, and their harpoons struck her. She was struck five or six times, and was at last killed. The captain of the Neptune expostulated with the captain of the Experiment, observing, that it was impossible the latter should dispute his title, as his harpoon, which was first struck, had all along remained fixed to the boat. He said, that it was evident he had never left the pursuit of the fish; on the contrary, instead of cutting the line with a hatchet, to save the lives of the crew, he had given the whale the boat, in order that when it arose again, it might appear like a buoy crying out, "This is the fish of the Neptune." He added, that the boats of the Neptune were at hand to assist; surely, then, he could not pretend to have any right to keep the whale. "Aye, marry, do I," replied the other, "and I claim your harpoon, line, and boat, too; and, by God's providence, I will have them." This phrase was not without its meaning; for the people of Greenland, not the most cultivated and polished place in the world, had a notion that every thing they found afloat, God's providence sent, and so they kept it. The captain of the Neptune did not think proper to decide the difference by force of arms, but said he should refer it to the laws of this country. Upon his return, he was anxious to avoid litigation, and applied for his line and boat; but the defendant said, "When you get your fish, you shall have your line and boat, but not before." The Learned Counsel submitted, that the principle on which this case ought to be decided was this: It was not because a particular person struck a fish, and his harpoon remained in her, that she was his property; it must appear that he was in pursuit of her, and of that fact some evident sign was required. If a boat's crew found that a fish was too strong for them, they had always an hatchet ready to cut the line; and when they preferred their own safety to the fish, any one might afterwards pursue it; but if they meant to retain the occupancy, they kept the line fixed to the boat. The boat's crew of the Neptune had done the latter; they had never quitted the line, but had, at the peril of their lives, given the whale the boat,

in order that they might not be said to have abandoned their right. WILLIAM KELD, the harpooner, distinctly proved the facts stated by Mr Solicitor-General. He said the whale, as soon as he struck her, ran out five lines, amounting to 650 fathom, or 1300 yards; the lines were fastened to the boat, and they gave the boat for the safety of the fish; they got upon the ice, and made the usual signal; the boats of both ships came up, and in about three quarters of an hour the whale rose, and the Experiment's boats struck her.

On his cross examination, he said, it was not for the crew to remain in the boat; if they had, the whale would have given them a journey under the sea.

Lord ELLENBOROUGH observed, that the question was reduced to the mere title to the boat. As to the whale, the occupancy was gone. The crew of the Neptune's boat had ceased to hold the fish; and they could not be said to hold it more, because the boat was attached to the line, than if any other weight had been affixed to it. He was of opinion, that the harpoon and other things used as instruments of chase, might be cast away in the adventure. A man who wounded a bird, which another afterwards killed, might as well claim the shot.

Mr ERSKINE said, that after what had fallen from his Lordship, it was not necessary for him to enter fully into the subject. He was persuaded his Lordship would not suffer a custom to be violated, which had been over and over again established, more especially after it had been observed by a learned Judge (Buller), that as the subjects of all nations were engaged in the fishery of these seas, it would be highly inconvenient for the courts of one nation, to alter the general custom established by all. The doctrine had even gone the length of saying, that after a whale had been killed, brought alongside a ship, and the operation of flensing, or cutting out the blubber, had commenced, if a sea came and washed her away, she became what was called a loose fish, and any vessel might take her. He referred to the *crim. con.* cause tried some years ago, in which he had elucidated the subject in dis-

cussion, by comparing Mrs E. to a loose fish, whom any one had a right to seize. In that case, Mr E. the husband, had originally harpooned the lady; he had her fast; but when he found she ran out too much line, he left her to plunge into the sea of folly and dissipation by herself, dragging the weight of her marriage vow along with her. But he did not the less abandon her because she was fastened to his boat. When he wished to recover her, or damages for her loss, it was said, No,—he had given her up,—he had left her to her fate, and as another had harpooned her, he had a right to retain her. He admitted that the Solicitor-General had put the present case very fairly, when he said the boat was placed like a buoy, to cry out, "This is the fish of the Neptune." If such an argument could prevail, it would only be necessary to tie a buoy to a line, and it might cry stinking fish long enough before any one would be at the trouble of saving the whale attached to it. He concluded, by expressing his firm conviction that the law was with the defendant.

Lord ELLENBOROUGH said, he could not help making a distinction as to the boat, which the men quitted in order to save themselves. With regard to the harpoon and line, the fish, when it made off with them, acquired, if he might use the phrase, a kind of property in them, and any body who afterwards took the fish had a right to the harpoon in it.

The defendant undertook to return the boat, and the Jury gave a verdict for the plaintiff. Damages 1s.; costs 40s.

No. VI.

SIGNALS USED IN THE WHALE-FISHERY.

The commanding view which is obtained from a ship's mast-head, enables a person on the look-out in the crow's nest to form a much more correct idea of the movements of a whale, and of the position of boats, ice, &c. than it is possible for the most experienced person to do from a boat moving on

the surface of the water. Hence, it is usual for the captain of every whale-fishing ship, to adopt a few simple signals, whereby he can direct his boats when at a distance beyond the reach of his voice. Signals used in the fishery may be classed under two kinds, General and Particular.

I. Under the term General Signals, I include such signals as are universally used and understood by every person conversant with the fishery. The articles employed for the purpose of making these signals consist of a "Bucket" or ball, a Union-jack or other small square flag, an Ancient, and a Wheft.

1. *The Bucket.*—This consists of a cylinder, or globe of canvas, extended by means of iron or wooden hoops, and usually coloured black. When the bucket is displayed at the mast-head, it recalls the boats to their ship from the pursuit of a fish, or from any other embassy. When it is violently drawn up, and alternately let down for many times successively, it is an urgent call to the boats to return. When hoisted half way up from its usual resting-place to the mast-head, it may either signify that one boat is only wanted when many are away, or that the officers in the boats may use their pleasure in attending to it; that is, they may remain abroad if they conceive they have any prospect of success, if not, they are expected to return to their ship.

2. *The Jack.*—In the fishery, this flag is used to indicate, that the boats belonging to the ship bearing it are engaged with a fish. Its intention seems originally to have been extremely liberal. By it, a ship fishing might be distinguished among a number, and others might be directed to the same place, where probably more fish were to be found. It has, however, additional uses in the present day. It serves to intimate that a fish is harpooned, to the other boats belonging to the same ship which may happen to be at a distance, and not aware of the circumstance: but most usually, it is displayed as a precautionary measure, to prevent the interference of any other ship with the fish so struck, excepting in the way of an auxiliary, in which case it gives a friend an opportunity of as-

sisting. To prevent disputes with regard to the title to a fish that has been struck, it is generally good policy, when other ships are near, to keep the jack flying until the fish is killed.

When a jack is moved violently up and down the mast, it proclaims the appearance of the fast fish on the surface of the water; and when it is thus accompanied with the bucket, it expresses that the fish is in the line of or near to the ship.

Before the commencement of the fishing season, a jack or ancient is used as a kind of complimentary signal to a friend; expressing as much as the usual greeting "How do you do?" and on sealing stations, the jack is sometimes substituted for the bucket in recalling the boats.

3. *The Ancient.*—When this flag is hoisted at the mizen peak, or mizen top-mast head, in the latter end of the fishing season, it indicates that the ship carrying it is "full," and homeward bound.

Hoisted in the main top-mast rigging, or indeed in any other situation *union downward*, the ancient, or national flag, is a universal sea signal of distress. The ancient is also used as a complimentary signal, and sometimes as a signal expressing a desire to speak with the captain of the ship to which it is addressed.

4. *A Wheft.*—An ancient tied together in such a way as to prevent its being extended up and downwise, but which does not prevent its horizontal extension under a breeze of wind, is called a wheft. It is a signal used in the fishery in very urgent cases. When displayed to a ship, it expresses an earnest wish to speak with the captain; and when in the fishery, addressed to the boats, it is usually meant to recall them peremptorily, howsoever they may be engaged; under which they are authorised, when fast to a fish, to cut or break the line, or at least they are commanded by this signal to make every possible exertion to join their ship. The cases wherein this signal is principally requisite, are in storms and in closing ice, or when the ship and boats are in danger of getting beset in a hazardous situation, or the crews of the boats of perishing by delay.

5. *Distant Signals.*—Besides these signals, the sails of the ship are frequently used as distant signals. Thus, top-gallant sails loosed but kept cleared up, is a recall for the boats when at such a distance that the bucket cannot be seen; the jib half hoisted is a signal for a fish a-head of the ship, &c.

II. Particular Signals are such as are contrived by the captain of any ship for the direction of his harpooners when on the fishery, to whom they are addressed; or such as may be agreed upon between any two or more captains, for making certain communications to each other when at a distance. The former, which are of most general use, consist of *waving* or pointing in a particular way and manner with a kind of screen, hat, or speaking trumpet, whereby a single boat can, at a short distance, be very accurately directed. A bugle-horn has been adopted for the same purpose, in combination with other signals; but signals with balls are of all others the most expressive, and at the same time perhaps the most simple. This kind of signal has been occasionally adopted, but only very partially, and has been generally abandoned on account of the mistakes on the part of the seamen to whom they were addressed, owing to the want of simplicity in the signals themselves. By means of a signal yard, placed across a pole erected at the top-gallant-mast head, three distinct positions for signals are obtained, the two yard arms and the pole end or signal-mast head. Now, by the different arrangement of balls in these three positions, not exceeding three in number, thirty-one distinct signals may be made. It may, however, be observed, that in accomplishing this number, it is always necessary that the people in the boats to whom the signals are addressed, should be able to distinguish the starboard from the larboard yard-arm. This will be self-evident when they are ahead or astern of the ship, provided they can see which way the ship is lying; and when the boats are a-beam of the ship, the *starboard* yard-arm may always be distinguished by bracing it forward. In addition to this, the starboard yard-arm might be painted red, and one of the

balls, to be displayed always on the same side, might be of the same colour. By this arrangement, the number of signals with three balls would be reduced to twenty-nine; but this would be sufficient for every purpose in the fishery.

Thus much refers to signals for clear weather; in a fog, however, other signals are requisite. These, from the nature of the circumstances, can only be conveyed by means of sounds, and are, therefore, extremely confined as to their explicitness, as well as their variety. They can be used only for directing the boats towards each other, or towards the ship. They consist of various sounds, such as shouting, a number of men at the same time, the ship's bell, horns, drums, muskets, or cannon. By means of a bugle, indeed, something more can be done than is usually practised; but as it would be a matter of difficulty to instruct the sailors in the meaning of the various notes, and combination of notes, of the bugle, and at the same time would require a considerable command of the instrument on the part of the person sounding it, it is not likely that this instrument will ever be brought into general use.

No. VII.

ACCOUNT OF SOME EXPERIMENTS FOR DETERMINING THE RELATIONS BETWEEN WEIGHT AND MEASURE, IN CERTAIN QUANTITIES OF WHALE-OIL.

Gauging is a process, which, though founded on correct principles, is of doubtful result, owing to the uncertain thickness of the staves of casks, and the irregular form of their interior. The thickness of the staves can only be estimated by the appearance of the ends of the cask, and of the bung stave; the latter, which is the principal guide of the gauger, if made half an inch thinner than the rest of the staves, would produce in a ton cask an error, in favour of the seller, of about 14 gallons. Besides, where no such fraudulent con-

struction is given to the bung-stave, there is always a liability to considerable error. I have often seen in the same cask, when gauged by two persons equally expert in the art, a difference of 10 gallons in its calculated contents; and even the same cask, brought twice within an hour before the same person, and he a "sworn gauger," has been estimated with a difference in the second trial of 7 or 8 gallons in its capacity. This being the case, the propriety of selling oil by weight has been generally acknowledged; yet the usual allowance of 7½ lb. to the gallon being found to fall short of the gallon by gauge, all buyers prefer gauge to weight. With a view of determining the exact equivalent by weight of a gallon of 231 cubic inches, the following experiments were made.

1. A light pear-shaped glass vessel, having a narrow neck and ground-stopper, weighed, when empty, 583.7 grains; when filled to the stopper with ice-water, temperature 60°, the weight was 1596.4 grains; hence the difference 1012.7 grains, was the contents of the vessel in water.

2. The same vessel filled with refined whale-oil, temperature 53°, weighed 1523.4 grains; from which deducting 583.7 the weight of the glass, we have 939.7 for the weight of the contained oil.

Hence, as 1012.7, the contents of the vessel in water, is to 1.000 the specific gravity of the water, so is 939.7, the contents of the vessel in oil, to 0.9279 the specific gravity of the oil.

Now, a grain of pure water, temperature 60° (according to the experiments of Sir G. S. Evelyn, corrected by Mr Fletcher in the 4th volume of the Philosophical Journal) weighs 252.506 grains troy. And according to the best experiments, the pound avoirdupois is equal to 7004.5 grains troy. So that 252.506 multiplied by 231, the number of cubic inches in a wine gallon, gives 58328.886, the weight of a gallon of water temperature 60° in grains troy. This divided by 7004.5, gives a quotient of 8.32734, or the weight of the gallon of water in pounds avoirdupois.

Therefore; As 1.000, the specific gravity of water, is to 8.32734, the weight in pounds avoirdupois of a gallon of water, so is 0.9279, the specific gravity of the oil to 7.72694, or 7 lb. 11 oz. 10.1 drams the weight of a gallon of refined oil at temperature 53°.

But this oil appears to be somewhat heavier than the oil of commerce; for the following results, derived in a similar way, were obtained from experiments with the common whale-oil.

Specific gravity, temperature 32°, = 0.9312
——————— ——————— 40, = 0.9289
——————— ——————— 44, = 0.9268
——————— ——————— 60, = 0.9214
——————— ——————— 63, = 0.9204

The change of specific gravity from temperature 32° to 63° is 0.0108, or 0.00035 for every degree of temperature. This proportion applied in a regular ratio gives the specific gravity of oil at every 5 degrees of temperature, from 30 to 70, as follows:

Temperature.	Approximate Specific Gravity.	Specific gravity by experiment.
30°	0.9320	.....
(32	0.9313	0.9312)
35	0.9302	.....
40	0.9285	0.9289
(44	0.9270	0.9268)
45	0.9267	.....
50	0.9250	.....
55	0.9232	.....
60	0.9215	0.9214
(63	0.9204	0.9204)
65	0.9198	.....
70	0.9180	.....

From these specific gravities, the following weights of whale-oil, at different temperatures, are derived; and it may be observed, that the weights, as calculated from the approximate specific gravities, in no instance differ above the tenth of a dram (less than 3 grains troy) in a gallon, from the weights derived more immediately from experiment.

Temperature.	Weight of a *Gallon* of Whale oil.			Weight of a *Ton* of Whale oil. (252 gallons.)		
	lb.	oz.	dr.	lb.	oz.	dr.
30	7	12	2.837	1955	15	4
40	7	11	11.375	1948	9	2
50	7	11	3.914	1941	3	0
60	7	10	12.452	1933	12	14
70	7	10	4.991	1926	6	12

Now, if we compare these results with the usual allowance of 7½ lb. of oil to the gallon, or 1890 lb. to the ton, we shall find that at temperature 60° there is a difference of 5¼ gallons in the ton.

On some future occasion, perhaps, I may publish tables of the weight of any number of gallons of oil from 1 to 300, at different temperatures, by means of which the contents of casks (the neat weight of the oil being known) will be given by inspection.

Were the plan of selling oil by weight, instead of measure, adopted, it would greatly facilitate the calculations, by employing decimal weights. And were the largest weight made use of 100 lb. there would be no danger of confounding it with any weights at present in use. All the variety necessary would be weights of 100 lb. 50 lb. 30 lb. 20 lb. 10 lb. 5 lb. 3 lb. 2 lb. 1 lb., and decimals of a pound if required.

No. VIII.

SOME ACCOUNT OF THE WHALE-FISHERY CONDUCTED IN THE SOUTHERN SEAS.

When I first entered on this work, it was my intention to include in it an account of all the known fisheries for the whale; but some reflection induced me to decide, that it would be better to present to the public a work, which, though partial, would be particular and original, than one that, if more general, would be indebted, to a considerable extent, to the information of others.

While I maintained my first intention, however, I addressed a letter to Captain Day of London, a respectable and successful southern fisher, through William Mellish, Esq. and received in reply a communication, possessing so much interest, that I should scarcely think it right to suppress it. The following queries formed the substance of my letter to Captain Day; the answers are the substance of his reply.

1. In what latitude and longitude, or near what land do you usually find the greatest plenty of *right* (mysticete) whales?

An. The situations resorted to by the *right* whales, are numerous. Among many others, I may mention, that they occur "on the Brazil Bank, from latitude 36° to 48° S. in the former parallel, in the months of November, December, and January, and in the latter in February, March, and April." In the same months are to be found many of these whales in the Derwent River, New Holland; also about the Tristian Islands; and in June, July, August and September they occur in Walwick Bay, and other inlets, on the coast of Africa. The same animals are likewise met with near the island of St Catharine, on the coast of Brazil; they also resort to some of the bays to the westward of Cape Horn, and to the northward of Coquimbo on the west coast of South

America. "The whales resorting to the latter situations are females, which go into shoal water for the purpose of depositing and rearing their young until nature has given them sufficient strength and powers to follow the older animals in all their meandrings in a deeper element than where they are first brought into existence."

2. In what situations are the largest quantities of spermaceti-whales usually found?

An. On the coasts of Chili, Peru, and California; about the Gallipago Islands and Marquesas; and indeed almost throughout the Pacific Ocean, the sperm-whales are to be found in great abundance.

3. Is there any particular season of the year for entering on the voyage out, and for prosecuting the fishery?

An. There is no particular season for the sperm whale; for the right whale, the seasons at which they usually visit certain coasts, as mentioned in answer to query 1st, must be attended to.

4. Do you ever take any other kind of whale besides the mysticetus or right whale, and the sperm whale?

An. Hunch-backs, finners, and sulphur-bottoms, are occasionally taken; the latter is a species of finner, very long, and swift in its going. The blubber on each of these kinds is seldom more than 6 inches thick, except on the breast; the whale-bone not longer than from 18 to 24 inches.

5. What is the usual length of time occupied in the passage out;—on the fishing-stations;—and on the voyage altogether?

An. The passage to the fishery beyond Cape Horn is usually about 4 months; on this side the Cape about 3 months. The stay on the fishery depends entirely on the success. The voyage in the sperm-fishery is seldom less than two years.

6. How many officers, men, harpoons, lances, whale-lines, and boats, are required for a ship of 300 tons?

An. There are three mates, who, with the master, are the principal harpooners; the whole crew consists of about 30

men and boys; the number of harpoons taken out are 100, lances 36, lines 28, boats 5.

7. Do you make a point of putting into any harbours in the course of the voyage?

An. Sometimes at the Cape de Verd Islands; at the Brazils and Falkland Islands; at the Gallipagoes, Marquesas, and other Islands in the Pacific; at New Zealand, Botany Bay, Lima, Valparisso, Conception, Paita, Quiaquil; which places are visited for procuring hogs, goats, fruit, and other refreshments, at an easy expence.

8. What kind of provisions do you chiefly use?

An. Beef, pork, bread, flour, pease, barley, and oatmeal.

9. Do you carry out a sufficiency of provisions for a whole voyage? or do you depend upon getting a replenish during your absence from home?

An. A sufficient quantity of provisions and stores for serving the whole voyage is always taken out.

10. Do you practise the same method of capture in your attacks on both the right whale and the sperm whale?

An. Invariably the same.

11. Which of the two do you reckon the most dangerous to attack, the sperm whale or the right whale?

An. There appears to be little difference: but both species of whales, generally speaking, are more active and dangerous in the tropical regions than they are in the Arctic seas; they therefore require more address in attacking, and caution in killing them, otherwise casualties, sometimes of a serious nature, would be innumerable.

12. Which of the animals that you attack are the swiftest?

An. The sulphur-bottom, (probably either the B. physalis, or B. musculus), appears to be the swiftest of the whale kind.

13. Is it usual for ships to fit out for both the fishery of the sperm and the right whale?

An. Ships, when fitted for the sperm-fishery, are adapted for taking any other kind of whale.

14. How many ships, English and foreign, do you suppose are at present (January 1818) in the trade?

An. Including Americans, at least 200 sail of ships.

15. Has any increase lately taken place in the number of shipping employed in the southern fishery?

An. The number is one-half more now than during the war.

16. What do you suppose was the magnitude of the largest sperm-whale you ever saw taken?

An. Extreme length 90 feet, girth about 30 feet (supposed), made 12 tons of oil, including 5 tons of head matter.

17. What might be the size of the largest whale of any other kind that you ever met with?

An. Length 86 feet, girth uncertain, produce in oil 13 (or 15?) tons.

18. The captain and crew, it seems, are rewarded for their exertions by certain shares of the cargo: of what proportions may these shares respectively consist?

An. Allowance to captain, officers and crew, something less than one-third (?) of the neat amount of sales. (This answer is not very satisfactory.)

19. What may be the usual expences of a ship fitted for the southern whale-fishery, in a voyage of medium length, and with a full or at least a good cargo?

An. If completely fitted, not less than 4000*l.* exclusive of the value of the ship.

20. Are there any instances of a ship returning without a sufficient cargo to defray the expences?

An. Such a case is very rare: when it does occur, it generally arises out of some mismanagement, or is to be attributed, sometimes, to fortuitous causes, which human prudence can neither foresee nor prevent.

21. What was the greatest freight, or most valuable cargo, that you ever knew obtained in one voyage?

An. Freight 30,000*l.*

22. Can you furnish any anecdotes as to the dangers attendant on the southern fishery?

An. Many; but as they would appear rather of a marvellous description, they might be misunderstood, or considered as exaggerated, if communicated.

23. Do you ever procure any ambergrease? if so, do you get it from the rectum of the whale, or is it found floating in the sea?

An. Ambergrease is frequently procured from the rectum of the whale, and sometimes found floating on the water. This substance appears to be formed in the rectum, and arises out of an extreme costive habit of the body of the animal. It is frequently voided during any extraordinary exertion or emotion, particularly on the whale being struck with a harpoon or lance.

The following additional remarks on this subject, obtained from conversations with various southern fishers, will conclude this article;

1. *Fishery of the Spermaceti Whale.*—This fishery is conducted on the western coast of America, in various parts of the Pacific Ocean, or in the Indian or China Seas, particularly about the island Timor.

The sperm whale is a gregarious animal, generally occurring in herds, sometimes of 200 or upwards. In such cases, there may often be seen one, two or three old *bull*-whales, which constitute the lords of the herd, the rest being principally, if not all, females. When other whales approach the herd, and attach themselves to any of the females, hard conflicts with the *bulls* will ensue, in which case they excoriate one another in a formidable manner. These whales divide themselves into classes, according to their age or sex; young males being found by themselves; young females under the protection of old *cows*; half-grown males by themselves, and so on. When the young males obtain sufficient strength, they venture into a herd under the protection of some very old bulls; this trespass on the seraglio is generally followed

by a conflict, which establishes them in the herd, or drives them off, according to the issue.

When a number of fish are seen, four boats, each furnished with 2 or 3 lines, 2 harpoons, 4 lances, and a crew of six men, proceed in pursuit; and, if practicable, each boat "fastens to," or strikes a distinct fish, and each crew kill their own. When in distant pursuit, the harpooner generally steers the boat, and in such cases the proper boat-steerer sometimes strikes the fish, but the harponeer generally kills it. When a fish belonging to a herd is struck, it generally takes the lead, and the whole herd follow it. A "fast-fish" seldom goes far under water; it generally swims off with extreme rapidity when struck, but usually stops after a short race, so that the boat can be hauled up by the line, or rowed sufficiently near to lance it. The dying struggles of the animal are so tremendous, that the water is beat by its fins and tail into a foam. The boats at this crisis, which is generally known to be approaching by the tall jets of blood discharged from the blow-holes, keep aloof, or otherwise they would be liable to be dashed to pieces.

Sometimes 10 or 12 fish are killed "at a fall;" but though many are occasionally wounded by the people in the fast boats, yet they rarely capture any that have not been harpooned. When the fish with which the boats are entangled are killed, they are towed to the ship; if more fish are then astir, and the weather fine, part of them, sometimes all, proceed again to the attack.

The flensing or "cutting in" process is somewhat different from that employed in the polar fisheries. A strap of blubber is cut in a spiral direction, and being raised by certain purchases, turns the fish round as on an axis, until nearly the whole of the blubber is stripped off. The head-matter, consisting of spermaceti mixed with oil, which, when warm, is in a fluid state, is taken out of large whales in buckets while they remain in the water; but the part of the head containing the spermaceti in small whales, is hoisted up in one mass, and opened on its arrival upon deck. The head-matter con-

geals when it is cold; it is put into casks in its crude state, and refined on shore at the conclusion of the voyage. The blubber, however, is reduced into oil soon after it is taken, in "try-works," with which every ship is provided for this purpose. The coppers in the try-works are two in number, and are placed, side by side, near the fore hatchway; these, with their furnaces, and casing of brick-work, occupy a space of 5 or 6 feet fore and aftways, 8 or 9 feet athwart ships, and 4 or 5 feet in height. The cavity of the arches of brick-work, on which the coppers and furnaces are raised, forms a cistern for water; so that when the fire is on, the deck is defended from injury by the changing of the water in the cistern twice or thrice every watch. As the oil is extracted, it is put into coolers, from whence, after standing about twenty-four hours, it is transferred into casks. The coppers are heated, in the first instance, with wood, but subsequently with the fritters of the blubber, which, containing a considerable quantity of oil, produce a fierce fire. A large fish, of the species most usually taken, produces about three tons of oil; a small fish from one to two tons. Sometimes the cargo of the ship will consist of above 100 whales, the produce of which, in boiled spermaceti oil, may be from 150 to 200 tons, besides head-matter.

2. *Fishery of the "right Whale," or Mysticetus.*—This animal is found in soundings, on the western coast of Africa, on the eastern coast of South America, &c. It seldom occurs so large as the kind met with in the seas of Greenland and Davis' Straits, the most usual size being that of 9 feet (whale) bone; perhaps 35 or 40 feet in length. The head is frequently covered with a bed of bernicles, consisting of several strata, so that its appearance is very different from that of the northern mysticetus, being altogether of a white colour. When struck, the southern mysticetus often dives to the bottom, the depth being seldom more than 200 fathoms, returns to the surface after an interval of a few minutes, and occasionally dives a second, a third, or a fourth time. But sometimes it takes a horizontal course, and "runs" along

shore 20 or 30 miles in a direct line. When it is seen by any others of the species, they usually take the alarm, and, running off, are followed by the fast fish as long as it is able. The first striker endeavours to "fasten" two harpoons in the first attack, both attached to the same line, by which he has a double security of the fish. The harpoons are usually thrown at the whale when at the distance of six or eight yards; and the lances, which are kept in fine order, are sometimes used in the same way. Two boats are considered sufficient to kill a right whale; so that when it can be accomplished, two are struck at the same time. The fast-boat is hauled up to the fish by the lines, whenever it appears at the surface; thus affording an opportunity to the harponeer to lance it, and enabling him sometimes to kill the fish without the assistance of any other boat.

When the right whale is flensed, the crown or upper jaw, with all the whalebone attached, is usually hove in altogether. The whalebone is then divided into junks, these, at the first leisure, are subdivided into single blades, "gummed," and stowed away. If a storm happens to arise before a fish can be flensed, a hawser is fastened to it, and the ship rides by it; at the conclusion of the gale, it is taken alongside and "cut in." If, however, an interval of more than two or three days occur before the flensing is commenced, the whale swells, the blubber becomes impregnated with blood, and is not worth taking in.

The voyage to the Pacific for the sperm-fishery sometimes occupies three years, but when the mysticetus is also attacked, it may be stated at from twenty months to two years. In the course of the voyage, they occasionally put into harbours to refit and refresh the crew. Their provisions for general use are salt; the quantity that can be allowed for so long a voyage is sometimes sparing, the quality often indifferent. The officers and crew are stimulated to exertion by certain shares of the cargo obtained. The captain receives, perhaps, a twelfth, the surgeon an eightieth, each of the harpooners a

fortieth, and every seaman from a one hundred and fortieth to a two hundredth part of the neat produce.

No. IX.

ON THE ANOMALY IN THE VARIATION OF THE MAGNETIC NEEDLE, AS OBSERVED ON SHIP-BOARD. By W. SCORESBY *jun.* Communicated to the Royal Society of London by the Right Hon. Sir JOSEPH BANKS, Bart. G.C.B. P.R.S.

Read Feb. 4. 1819.

The anomalies discovered in magnetical observations conducted on ship-board, were usually attributed to the imperfection of the azimuth compass, until Captain FLINDERS, in his modest and enlightened paper on this subject, published in the Philosophical Transactions, suggested that they were probably owing to the magnetic influence of the iron made use of in the construction of the ship. The truth of this suggestion, and the accuracy of his observations, have since met with full confirmation, and some of his practical rules founded thereon have received additional support, from the "Essay" of Mr BAIN, "On the Variation of the Compass," lately published.

As I have been materially anticipated by Mr Bain in a series of observations on the variation of the compass, which I conducted on the coast of Spitzbergen, in the years 1815 and 1817, it will be unnecessary here to enter into the detail of these observations, or enlarge upon the probable cause of the anomalies observed; it may be sufficient to give a table of the most accurate of my observations, and annex to it the few general inferences which were drawn from it, during the voyage in which most of the observations were made, (1817,) together with such remarks on each inference as seemed to me calculated for its elucidation. I shall, however, just premise, that I am not unconscious of the great liability to error in observations of this kind, and of

the variety of causes (arising out of the unequal distribution of iron in different ships, whereby numerous local attractions are formed) which contribute to the multiplication of those errors: it is, therefore, with deference that I submit these deductions, particularly as I conceive it will require observations to be made under a vast variety of circumstances, and in many different vessels, before *correct* and satisfactory conclusions can be drawn. It is *only* then as a step towards facilitating such general conclusions, the importance of which to our maritime concerns is so obvious, that I am induced to offer these observations and remarks.

TABLE

TABLE of Magnetical Observations made on board of the Ship Esk, *in Voyages to the Greenland or Spitzbergen Whale Fishery; with a view to investigate the laws by which the Anomalies, or Errors, discovered in the Indications of the Mariner's Compass on Shipboard are regulated.*

No.	Date.	Latitude.	Longitude.	Time. [Ch. Chronometer. Ap. Apparent.]	Sun's Azimuth. Observed.	Sun's Azimuth. True.	Variation. Apparent or observed.	Variation. Supposed true.	Errors produced in the observed variation by the attraction of the ship on the compass needle. Error attributed to the position of the ship's head. [Diff. of col. VIII. and IX.	Errors produced in the observed variation by the attraction of the ship on the compass needle. Differences produced by a change in the position of the ship's head. [From col. VIII.	Errors produced in the observed variation by the attraction of the ship on the compass needle. Differences produced by a change in the position of the compass. [From col. VIII.]	Ship's head by the binnacle compass.	Situation of the compass by which the Sun's azimuth [col. VI.] was observed.
I.	II. 1815	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	
1	June 30.	77°.10′N.	12°.15′E.	Ap. Noon.	S. 7°W.	South.	7° W.	21° W.	14°.0′			S. by E.	Starboard side of the main deck.
2	....	....	....	....	38	South.	38.00	21.00	17.00	.....	31°.0′	S. by E.	Larboard ditto.
3	....	....	....	....	21	South.	21.00	21.00	0.00	.....	17.00	S. by E.	Centre of main hatches.
4	1817. June 6.	77.56	0.15 W.	Ch. 6h 54 P. M.	N. 36 W.	N. 73° W.	37.00	32.30	4.30			W. ½ S.	On the binnacle amidships of the quarter-deck, 10 ft. from taffrail.
5	....	....	....	7.28	35½	64.30	28·45	32.30	3.45	8.15	.....	East.	
6	....	....	....	7.28	45	64.30	19·30	32.30	13.00	.....	9.15	East.	Compass on a stand on the middle of the quarter-deck, 6 feet abaft capstern spindle.
7	....	....	....	6.54	27½	73.00	45.30	32.30	13.00	26.0	.....	W. ½ S.	
8	....	....	....	7.32	33	63.30	30·30	32.30	2.00			E. ½ S.	Starboard side of the main deck.
9	....	....	....	7.33	31	63.15	32·15	32·30	0.15	.....	1.45	E. ½ S.	Larboard side of the main deck.
10	—— 19	77.36	2.35 W.	Ap. 11.38	S. 25 W.	S. 5.30 E.	30·30	36·00	5.30			E. by S.	On the binnacle, 10 ft. from taffrail.
11	....	....	....	11.20	27	10.00	37·00	36.00	1.00	6.30	.....	N.	Ditto.
12	....	....	....	12.03	34½	S. 0.45 W.	34·00	36.00	2.00	3.0	.....	NE. ½ E.	Ditto.
13	—— 28.	76.24	4.45 W.	Ch. 7.34	N. 46 W.	N. 68.11 W.	22.11	37.00	14.49			N N E.	Starboard side of the main deck.
14	....	....	....	7.38	16½	67.11	50·41	37.00	13.41	.....	28.30	N N E.	Larboard ditto.
15	July 16.	76.06	0.30 W.	Ch. 6.33	60	N. 19.54 W.	19·54	33.00	13.06			South.	Starboard side of the main deck.
16	....	....	....	6.36	33	79.09	46.09	33.00	13.09	.....	26.15	South.	Larboard ditto.
17	....	....	....	6.31	46	80.24	34·24	33.00	1.24	.....	11.45	South.	Centre of main hatches.
18	....	....	....	6.44	53	77.09	24.09	33.00	8.51			South.	Centre of fore hatches.
19	....	....	....	6.43	41	77.24	36·24	33.00	3.24	.....	12.15	South.	Larboard side of the fore-castle near the windlass end.
20	....	....	....	6.41	70	77.54	7·54	33.00	25.06	.....	28.30	South.	Starboard ditto.

The azimuths contained in the above Table, [col. VI.] were taken, either by the needle of a theodolite, or by a compass fitted up at sea for the purpose, with a card made extremely light, and a bar fastened edgewise to it by two brass screws, as represented in Plate II. fig. 4. The compass being small, the card light, and the needle very powerful, owing to the thickness of its ends, it performed incomparably better than an expensive azimuth compass of larger dimensions, which, indeed, was so sluggish and erroneous in its indications, that I could make no good use of it. I prefer a needle on its edge to one with broad flat ends of the usual form, because it must fix itself more accurately and certainly in the magnetic meridian. A broad flat needle, on the other hand, by having its ends ill tempered, may have the two poles at the two opposite corners, so that the magnetic axis may run diagonally. In this case, the middle of the bar may point 2 or 3 degrees or more, to the east or west of its proper position. The directive property of a horizontal magnetical needle being extremely small, in very high latitudes, it is of essential importance for the quick traversing of a compass, that the card and needle be as light as possible; for, in proportion as the weight of the card with its appendages is diminished, the friction on the point on which it traverses must be less. Hence, as the power of a magnet depends, probably, more on the extent of the surface of its ends than on its weight, I mean to prepare a compass for future observations with a hollow needle.

From these observations, and from the assistance afforded by the lucid remarks of Captain FLINDERS, the inferences which follow are deduced *.

1. In the construction of every ship, a large quantity of iron being used, the portions thereof which have a perpendicular position, such as standard and hanging knees, the nails and bolts in the deck, the capstern spindle, flukes of the anchors (when stowed as at sea), chain-plates, iron stanchions and riders; the eye-bolts, joint-bolts, transom-bolts, and hind axle-tree bolts of gun-carriages, and possibly the upper surfaces of the guns themselves, &c. &c. have a tendency to become magnetical, the upper ends being *south* poles and the lower *north* poles, in this hemisphere, where the north end of the needle dips, but the contrary in the southern hemisphere, where the south end of the needle dips.

(*a.*) That the attraction of a ship on the compass, depends principally on such iron as has an upright position there can be little doubt; though I believe this explanation of the cause of the anomaly in magnetic observations made on ship-board, has not been before suggested. This idea admits of a simple illustration. Take any magnetic needle suspended on a centre, a pocket compass, for instance, and present to it a bit of iron-wire, a nail, or any other piece of soft iron of a lengthened form, not being magnetic,

* The greater part of these inferences were drawn up during my voyage to the whale-fishery in 1817; and the whole paper, as now given, excepting a few notes that have been added, was sent to Sir Joseph Banks November 3. 1818, and was read before the Royal Society on the 4th February 1819. The additional notes are distinguished by the numbers prefixed being inclosed in parentheses. A paper by Captain Sabine, "On irregularities observed in the direction of the Compass needles of H. M. S. Isabella and Alexander, in their late voyage of discovery, and caused by the attraction of the iron contained in the ships," was also read before the Royal Society on February 18, 1819; and another paper, by the same author, containing "Observations on the Dip and Variation of the Magnetic needle, and on the Intensity of the Magnetic Force, during the late Voyage in search of a North-west passage," was read on the 25th of the same month.

and the following effects will be invariably produced. If the upper end of the nail, when in an erect position, be presented to the north end of the needle, it will attract the needle, and draw it aside; but if presented to the south pole, the nail will repel the needle. If the nail be then reversed, and the contrary end now upwards, (which before the change of position would have attracted the south pole of the needle, and repelled the north), be presented to the compass, it will be found to attract the north end of the needle. Hence, it is clear, that the moment the soft iron is placed nearly in the position of the dipping needle, it becomes a magnet, the upper end being a south pole, and the lower end a north pole. But as it has no power to retain the magnetism that it has acquired, its poles are immediately changed, if its position be reversed. And if the nail be laid in a position almost horizontal, or rather, if it be placed in a position at right angles to that of the dipping needle, it ceases to be a magnet, and, excepting when very near the magnetic needle, evidences no attraction for it whatever. For illustrating these properties of bar-iron, I have constructed a small apparatus, in which a piece of thick iron-wire, 6½ inches long, is attached to a plane of mahogany that is moveable through 260 degrees of a vertical circle, so that the end of the bar is always at the same distance from a magnetic needle, and can be presented to it at any given angle, by means of a vertical graduated circle of brass. On performing some experiments with this apparatus, the following results were obtained:—1. When the bar was in the plane of the magnetic meridian, and the north pole of the magnetic needle was placed about an inch to one side of the end of the bar, no deflection whatever was produced, so long as the bar was in the direction of the magnetic equator; but an attraction of 22° was produced when the upper end of the bar

was presented in the direction of the dip,—an attraction of $3\frac{1}{2}°$ when the bar was in an horizontal position, —and a repulsion of 44° when the lower end was presented in a vertical direction. The great difference of the deflective power of the upper and lower ends arises thus: When the upper end of the bar was presented to the N. end of the needle, it was attracted, and the S. end thrown off to a distance of nearly 3 inches, and into a position of such obliquity, that the effect of repulsion on this end was trifling; but when the lower end, or north pole of the bar, was presented, the north end of the needle being repelled, the south end approached the bar to within an inch and a half, and came into a right-angular position to the attractive force, by which the effect of the bar was doubled, the south pole being attracted as much as the north pole was repelled.

2. A steel bar, hardened at the ends, and very slightly magnetised, being substituted for the iron bar, the effects produced on the needle were varied. When the north end of the steel bar, in the magnetic equator, was presented to the north end of the needle, the repulsion was about 44°; in the direction of the magnetic poles, the repulsion, with the south end depressed, was only 13°; but, with the south end elevated, it was nearly 100°. Hence, magnetised steel is evidently stronger in its polarity, when in the direction of the dip or magnetic poles, than in any other position.

In these two experiments, it will be observed, the lower end of the iron bar, when in a vertical position, and the north end of the magnetised steel bar, when in the position of the magnetic equator, had exactly the same influence over the magnetic needle, each producing a deflection from its natural position of 44°. If, therefore, the quantities of deflection of a magnetic needle, freely suspended, be measures of the force of the polarities of any magnets presented to it at similar distances, and in the same position, as is reasonable to

suppose, then, it would appear, that the iron bar and the steel bar, when in certain different positions, possessed the same strength of polarity, their deflective power over the magnetic needle being equal. But though their polarities appeared to be similar, their powers of attraction for iron were different; each of them, indeed, when presented (in the magnetic meridian, and in the same positions as when their polarities were found to be similar,) to a piece of fine iron wire, freed from magnetism, floating on a surface of water, attracted it forward; but the steel bar was capable of lifting the wire when it was sunk in the water, while the iron bar could not so much as move the smallest fragment of the same. Hence, it would appear, that that property of magnets by which polarity is produced, is not the same as that by which they attract iron. In making the above experiments, the iron bar was heated red hot, and allowed to cool gradually in the position of the magnetic equator, immediately before it was used, by which it was entirely freed from a sensible degree of magnetism that it had accidentally acquired.

2. The combined influence of the iron distributed through all parts of the ship, seems to be concentrated into a kind of magnetic *focus of attraction*, the principal south pole of which being upward in the northern hemisphere, is probably situated, in general, near the middle of the upper deck, but nearer to the stem than the stern.

a. Wrought iron having a much greater attraction for the magnetic needle than cast-iron, the anchors, which usually lie about the bows, possess much more influence over the compass than guns; hence the focus of attraction lies nearer to the bows than to the stern.

3. This focus of attraction so influences the compass needle, that it is subject to an *anomaly* or variation from

the true meridian, different from what is observed by a compass on shore; the north point of the compass being constantly drawn towards the focus of attraction, which appears to be a south pole in north dip; and the south point being attracted in south dip, where the focus of attraction becomes a north pole.

a. The phenomenon of a ship appearing to lie nearer the wind when beating to the northward, with the wind at north, than when beating to the southward, with a southerly wind, was observed by my father at least 20 years ago, which phenomenon he attributed to the "attraction of the ship upon the compass;" and ever since the year 1805, I have been in the habit of allowing only 2 to $2\frac{1}{4}$ points variation on the passage outward to Greenland, with a northerly or north-easterly course, but generally three points variation on the homeward passage when the course steered was S. W. or S. W. b. W. Without this difference of allowance, a Greenland ship outward bound will be generally found to be several leagues to the eastward of the reckoning, and homeward bound will be as much as 4 or 5 degrees to the eastward of it.

4. This anomaly in the variation of the compass, occasioned by the attraction of the iron in the ship, is liable to change with every alteration in the dip of the needle, in the position of the compass, or in the direction of the ship's head.

a. If the intensity of the terrestrial magnetism be not equal in all parts of the globe, then the anomaly in the variation of the compass will be also liable to change with every alteration in the magnetic influence of the earth. This is a point of such importance, I conceive, in the science of magnetism, that I was very anxious to procure a dipping needle on my last voyage to Greenland, (in 1818), to ascertain, by its oscillations, whether the magnetism of the earth, by which the dipping

needle is influenced, be not greater near the magnetic pole than it is in England. If it be equal, the oscillations of the same dipping needle would be performed, circumstances as to temperature and local attraction being the same, in equal spaces of time in both places; but if the magnetic power in either place be greater, the oscillations of the needle would there be quicker.

b. The number of vibrations of a horizontal needle, performed in a certain space of time in Greenland, is to the number performed in an equal space of time in England as 5 to 6, each longer vibration in England being performed in five seconds, and in Greenland in six. No alteration was observed as to the time required for each vibration, whether the temperature was high or low, but I think in a low temperature the vibrations performed by the needle before it stopped were fewer.

(*c.*) The time of oscillation of the same dipping needle, under different degrees of magnetic force, appears to me to be reciprocally proportional to the square root of the magnetic force; or the square of the number of oscillations performed in a certain interval of time, will be directly proportional to the magnetic intensity. Now, from the observations of Captain Sabine "On the intensity of the Magnetic Force," (Phil. Trans. 1819, p. 132.), it appears, that the times in which 100 vibrations of a dipping needle were made in different situations, during the late voyage of Captain Ross, were as follows:

Latitude, North.	Longitude, West.	In the meridian.	First arc.	Perpendicular to meridian.	First arc.	Dip.	Situation of the Dipping Needle.
° ′	° ′	m s	°	m s	°	° ′ ″	
51.31	0.08	0.00	0	8.18.3	90	70.34.39	Regent's Park; London.
60.09	1.12	7.49¾	74	7.59.5	90	74.21.28	Shetland.
68.22	53.50	7.20	83	7.33	90	84.08.07	On ice: Davis' Straits.
70.26	54.52	7.21	83	7.26	90	82.48.47	Hare Island.
70.35	66.55	7.16	83	7.18.5	90	84.39.21	On ice; Baffin's Bay.
75.05	60.23	7.27½	84	7.26	90	84.25.06	On ice; Baffin's Bay.
75.51	63.06	7.23½	84	0.00	—	84.44.30	On ice; Baffin's Bay.
76.08	78.21	7.16	85	7.18	90	85.59.31	On ice; Baffin's Bay.
76.45	76.00	7.15	85	7.26	90	86.09.13	On ice; Baffin's Bay.
51.31	0.08	8.02	70	8.18	90	70.33.16	Regent's Park; London. After the return of the Expedition.

So that from this Table it would seem, that in Captain Ross's voyage, the intensity of the magnetic force was the greatest where the dip was the greatest, and generally, though not uniformly, increased as the dip increased. In London, where the dip is 70°.34′, 12.45 vibrations of the dipping needle, when in the meridian, were performed in a minute; and in Baffin's Bay, where the dip was 86°.9′, 13.8 vibrations were performed in the same interval.

Hence the magnetic force in the two positions, appears to be as the square of 12.45, or 155, the number of vibrations in London, to the square of 13.8 or 190, the number performed in Baffin's Bay. These observations would have been much more valuable, had they been accompanied by a corresponding number of observations performed in the same situation by a horizontal needle.

(*d.*) Captain Ross informs us, in the Appendix to his "Voyage of Discovery," that in his experiments on local attraction, the magnetic anomaly or "deviation appeared to be materially affected by heat and cold, as well as by atmospheric humidity and density;" and that the direction of the wind seemed to have an irregular effect on the deviation.

5. The anomaly of variation bears a certain proportion to the dip of the needle, being greatest where the dip is greatest, diminishing as the dip decreases, and disappearing altogether on the magnetic equator.

a. Captain Flinders ascertained, that the medium error or anomaly for 8 points deviation of the Investigator's head, on either side of the magnetic meridian, was very nearly $\frac{1}{20}$th of the dip, .05 the decimal expression of which, he considered to be the common multiplier to the dip, for obtaining the radius of error at any situation in the southern hemisphere; and .053 to be the common multiplier, from England to the magnetic equator.

b. This, however, can only be correct within certain limits, as on the magnetic pole, where the anomaly would probably be equal to the dip, or 90°, the decimal multiplier would require to be increased to 1.0. Hence it was suggested, by an officer in the expedition under Captain Ross, that in those parts of the globe where the dip is 90°, the compass needle would probably always stand N. and S., by the attraction of the ship. This position clearly follows from the inference above, provided the compass be placed near the ship's stern in mid-ships; but if placed as described in inference No. 8. the ship's head by the compass on the starboard side of the main deck, would always appear to be *east*, and on the larboard side *west*.

(*c.*) This last remark is further established, by the increasing power of the local attraction in high latitudes, and the diminishing energy of the compass needle. For the directive power on a horizontal magnetic needle, supposing the magnetic force to be always equal, is proportional to the cosines of the dip. Hence, if the directive force on the magnetic equator be called 1.0, under a dip of 60°, it will be equal to $\frac{1}{2}$; under a dip of 70°.32′, to $\frac{1}{3}$; under a dip of 75°.31′, to $\frac{1}{4}$; under a dip of 78°.28′, to $\frac{1}{5}$; under a dip of 80°.24′, to $\frac{1}{6}$;

under a dip of 81°.47′, to $\frac{1}{7}$; under a dip of 28°.49′, to $\frac{1}{8}$; under a dip of 83°.37′, to $\frac{1}{9}$; under a dip of 84°.15′, to $\frac{1}{10}$; under a dip of 87°.8′, to $\frac{1}{20}$; under a dip of 88°.5′ to $\frac{1}{30}$; and under a dip of 90°, the cosine being 0, the directive power of a horizontal needle will also be 0; so that the local attraction must operate altogether.

(*d.*) But as the magnetic force is found to increase as we approach the magnetic poles, the directive power on a compass needle, with an increase of dip, must diminish in a somewhat less ratio than the cosines of the dip. Let d be the dip, v the number of vibrations in a certain interval, say a minute, of the dipping needle traversing in the magnetic meridian, and x the directive power on a horizontal needle; then

$$x = \cos d.\, v^2.$$

(*e.*) The increase of the magnetic anomaly on approaching to the magnetic pole, has been clearly shown by Captain Ross, ("Voyage to Baffin's Bay," Appendix, N° I.) By observations on the deviation of the compass made on board of the Isabella in Shetland, where the dip is 74°.21½′, the maximum of error was —5°.34′ on an E. S. E. course, and + 5°.46′ on a W. N. W. course, giving 11°.20′ of extreme difference. But in Baffin's Bay, latitude 75—76°, where the variation of the compass was between 86° and 96° W. and the dip between 84½° and 86°, the maximum of error on a course E. 17° S. had increased to — 20°.30′, and to + 22° on a course W. 17° N.; thus affording an extreme difference of 42°.30′. Hence, while the multiplier to the dip, on Captain Flinders' principles, was in Shetland only .076, in Baffin's Bay it had increased to 0.25.

6. A compass placed near the stern, amidships of the quarter-deck, is subject to the greatest anomaly or deflection from the magnetical meridian, when the ship's course

is about west or east; because the focus of attraction then operates at right angles to the position of the compass-needle; but the anomaly generally disappears when the course is about north or south, because the focus of attraction is then in a line with, or parallel to, the compass-needle, and consequently has no power to deflect it from its direct position. (See Observations in the prefixed table, Nos. 4, 5. 10. 11. and 12.)

a. This situation for the *binnacle* is deemed one of the best in the ship, and is very properly preferred. Being abaft the focus of attraction, the north point of the compass, in this magnetic hemisphere, is always attracted forward, and the errors at equal distances from the magnetic meridian, in the same dip, are alike in quantity both on easterly and westerly courses, and always (excepting in cases where any large mass of iron is placed near the compass) towards the north; the correction, when applied to the *apparent course*, must therefore be towards the south, to give the true course steered. Thus, the ship's head being west by the compass, where there is 10° of local attraction or anomaly on each side of the magnetic meridian, the true course will be W. 10° S., and her head being east *per* compass, the course corrected will be E. 10° S.; and hence, in high northern latitudes, where the anomaly is thus great, a ship steering west by the compass 100 leagues, and then east 100 leagues, instead of coming to the place from whence she started, will be 104 miles to the southward of it.

(*b.*) Where the distribution of iron in a ship is unequal, more being on one side of the midship line than on the other, the course of no anomaly will not be north and south, but something to the right or left of it, accordingly as the greater mass of iron may be on the starboard or larboard side. Hence, in the Isabella, when under the command of Captain Ross, the line of no deviation was found to be 17° from the magnetic meridian; or when the course was N. 17° E. and S. 17° W.

(c.) Although the after-part of the quarter-deck appears to be the best situation for the binnacle, yet it is desirable to have a compass, for reference, placed as far as possible, out of the attraction of the iron in the ship. A compass at the jib-boom end, where the travellers and hoops are of copper, or at the top-gallant-mast head, which is better, is found to be scarcely at all influenced by the attraction of the ship. Hence, I have been in the habit of carrying a compass, occasionally, in the crow's nest, fixed at the mast head, where it was found to be free from those anomalies which are so sensible in a compass on deck.

7. The greatest anomaly with the compass in the position last described, being ascertained by observation, the error on every other point of the compass may be easily calculated; the anomalies produced by the attraction of the iron in the ship, being found to be proportionate to the sines of the angles between the ship's head and the point of no anomaly, which point is most commonly the magnetic meridian.

(a.) On the supposition that the point of no anomaly occurs when the position of the ship corresponds with the magnetic meridian, that is, when her head lies north or south, Captain Flinders has given the following rule: —As the sine of eight points (or radius) is to the sine of the angle between the ship's head and the magnetic meridian, (or sine of the course reckoned from south or north), so is the anomaly found at east or west by observation, to the anomaly on the course steered; or, the anomaly on any other course being found by observation, the error on that position of the ship's head would be to the error at east or west, at the same dip, as the sine of the angle between the ship's head and the magnetic meridian, to the sine of eight points, or radius."

(b.) As, however, the line of greatest error is not always north and south, the above rule has been modified by

Captain Sabine as follows: —The error produced in any direction of the ship's head, will be to the error at *the point of greatest irregularity*, [instead of east and west], as the sine of the angle between the ship's head and *the points of no error*, [instead of the magnetic meridian], to the sine of eight points or radius.

(c.) To find the greatest anomaly and the point of change, or no anomaly, the following *rule* appears one of the most simple. Take the bearing of the sun, or any other distant object whose true bearing from the ship is known, with the binnacle compass when the ship's head is put upon each rhomb; if they are all the same, there is no anomaly; but their differences from the true bearing, after the application of the variation, (which should be determined out of the vessel), will give the anomalies on the respective courses; and the points on which there are no differences, will be the points of change. When the sun is the object observed, it is only necessary to take an altitude, along with two or three of the bearings, and the intervals of time, by an easy approximation, will give the true bearings for the intermediate observations. When the sun is near the meridian, and particularly in high latitudes in summer, an allowance of a degree of azimuth for 4 minutes of time, will be sufficiently accurate for intervals of an hour. The true bearing of a distant fixed object may be found, in a perfectly smooth sea, by sending a copper-fastened boat in the direction of the object, for, when exactly in the required line, the true bearing of the object from the boat will give the true bearing from the ship. When among ice, or near shore, the same result may be obtained more accurately, by sending an observer to some distance in the required line, for taking the bearing of the object. The transit bearings of two objects, of which the position with regard to one another is known, is preferable perhaps to any thing else.

8. A compass placed on either side of the ship's deck, directly opposite to, or abreast of, the focus of attraction, gives a correct indication on an east or west course, but is subject to the greatest anomaly when the ship's head is north or south; and being here nearer the focus of attraction, the anomaly is much greater than that observed on an east or west course with the compass placed in the binnacle near the ship's stern.

a. This inference is founded on Observations No. 1, 2, 3, 8, 9, 13, 14, 15, 16. and 17. of the prefixed table. The latter part of the inference, namely, that the greatest anomaly occurs here when the ship's head is north or south, is fully and uniformly established; but the former part rests only on the authority of Observations No. 8. and 9, though it derived additional support from several observations which I have excluded, because neither the sun, nor any other distant object, calculated for proving the accuracy of the observations and determining the clear effect of the "local attraction," was visible.

9. A compass placed within six or eight feet of a capstern spindle, or anchor, or other large mass of wrought iron, foregoes, in a great measure, the influence of the focus of attraction, and submits to that of the nearer body of iron.

a. The effect of this is various, according to the relative position of the compass and the iron. When the compass is placed directly *abaft* the body of iron, the influence is similar to, but greater than, that of the focus of attraction on a compass placed near the stern, as described in inference No. 6. (See Table of observations prefixed, No. 6, and 7.) When placed directly *before* it, the anomaly is similar in quantity, but has its sign reversed; and when placed on either side of the mass of iron, the influence corresponds more nearly with that of the focus of attraction on a compass placed in the sides of a ship opposite to it, as described in inference No. 8. A compass placed

upon the *drum-head* of the capstern, anywhere out of the centre, will have its north point so forcibly attracted by the upper end or south pole of the spindle, that the ship's head may be made to appear to be directed to any point whatever, at the pleasure of the experimenter. I have sometimes excited the astonishment of my officers by taking the binnacle compass, and so placing it on the capstern-head, that the ship has appeared to be steering a course directly contrary to that intended.

10. When the iron in a ship is pretty equally distributed throughout both sides, so that the focus of attraction occurs in midships, a compass placed on the midship line of the deck, (drawn longitudinally) will be free from any anomaly from one end of the ship to the other, when the course is north or south; but on every other course an anomaly will generally appear, increasing as the angle between the ship's head and the magnetic meridian increases, until the error is at a maximum, when the course is east or west.

a. The unequal distribution of iron in the ship, on board of which I made all my experiments, prevented the above effect from being realized. A blacksmith's shop was situated between decks, on the larboard side of the fore-hatchway. It was lined with sheet-iron; and besides the armourer's forge, vice, &c. contained a large quantity of other iron. The effect of this, together with the anchors, windlass-necks, &c. was very remarkable on a compass placed in different parts of the deck near the foremast. (See Observations 18, 19, and 20. of the prefixed Table.)

11. As a compass placed on the midship line of the deck is subject to no anomaly fore and aft, in certain ships, on a north or south course (Inference No. 10), and as a compass in either side of the ship, opposite to the focus of attraction, shows no anomaly on a west or east course (Inference No. 8), the inter-

section of the line joining the two situations in opposite sides of the ship, with the midship line traced fore and aft, will probably point out a situation directly over the top of the focus of attraction, where no anomaly on any course whatever will appear.

a. The Esk, in which I made my magnetical observations, had, as above stated, an armourer's forge near the larboard bow, which, with the varying position of large quantities of iron-work, composing our whale-fishing apparatus, contributed to vary this point, where no anomaly is supposed to exist, and prevented me from ascertaining satisfactorily, at any time, its precise situation. I made, indeed, but few observations with this view, and these, I find, neither establish nor refute the inference.

12. The anomaly of variation is probably the greatest in men of war, and in ships which contain large quantities of iron; but it exists in a very considerable degree also in merchantmen, where iron forms no part of the cargo, especially in high latitudes, where the dip of the needle is great.

(*a.*) A model of a vessel built of timber and plank, and fastened with iron, which I have procured for showing the nature of the magnetic anomaly, as connected with the course steered and the position of the compass, is capable of illustrating almost the whole of the preceding inferences. In this model, as well as in actual practice, the vertical iron only is found to be capable of affecting the indications of the compass; the largest pieces of iron placed horizontally, unless within an inch of the needle, having little or no influence, while the same, in a vertical position, produce a sensible effect at the distance of almost a foot.

(*b.*) While I was copying this paper for the press, a little model of a vessel was shown me by Dr Traill, made by a Mr Bywater of Liverpool, for exhibiting the superior attraction of upright bars of iron over hori-

zontal bars: it also shows, in one position, the nature of the local attraction. It acts entirely on the principle stated in the 1st inference, and illustrates the 6th.

No. X.

EXPLANATION OF THE PLATES.

The Roman numerals and Arabic figures after the name of any article, point out the volume and page of the Work, where such figure is particularly referred to or described.

Frontispiece. A representation of the ship Esk when in distress. The particulars of this misfortune, with the successful issue of the voyage, are given in chapter vii. of this volume. [See Vol. II. p. 457.]

No.

I. General map of the Polar Regions. This map was drawn with great care, partly from the beautiful eight sheet map of the world on Mercator's projection, by Arrowsmith, and partly from the best charts of the sea coast of Europe and N. America, including some original surveys, and, through the liberality of Captain Ross, the whole of his survey of Baffin's Bay.

II. Instruments, &c.

1. Stone lance found in a whale taken near Spitzbergen. I. 11.
2. Marine diver. I. 186.
3. Lines of temperature. I. 538.
4. Improved compass needle. II. 538. Note, Table.

III. Appearances of Spitzbergen and adjacent islands.

1. View of Cherie Island. I. 153.
2. The Three Crowns. I. 99.
3. Middle Hook of the Foreland. I. 97.
4. Horn Mount. I. 96.
5. Hakluyt's Headland and the Norways.

No.

IV. Survey of Spitzbergen, the west coast original. I. 113.

V. Appearance of Jan Mayen Island. I. 163.

VI. Survey of Jan Mayen Island, the S. E. coast original. I. 154.

VII. Chart of the situation of the ice in the Greenland Sea, in the years 1806, 1817, 1818, &c. I. 284.

VIII.
IX.
X.
XI. } Figures of snow crystals. I. 427, 431.

XII. Representations of whales.

1. Side view of the Balæna Mysticetus or common whale. Described in Vol. I. p. 449. [Scale $\frac{1}{10}$th of an inch to a foot.]
2. Cub of the B. Mysticetus. [Same scale.]
3. Narwal or Unicorn. [Same scale.]

* XII. Belly view of the Balæna Mysticetus. I. 449.

XIII. Whale and Dolphin.

1. Delphinus deductor. I. 496.
2. Balæna rostrata. I. 485.

XIV. Beluga or White Whale. I. 500.

XV. Narwal and Shark.

1. Male Narwal. [Scale $\frac{3}{8}$ths of an inch to a foot.] I. 486.
2. Belly view of the same.
3. Squalus Grœnlandicus. [Same scale.] I. 538.
4. Belly view of ditto.
5. The eye of the Shark, on a larger scale, showing the form of a curious appendage that is generally found attached to the pupil. I. 539.

XVI. Figures of Medusæ and other animals, constituting the principal food of the whale.

1, 2. [Natural size.]

No.

3, 4, 5, 6, 7 and 8. Medusæ, described in Vol. I. p. 548–550.

9. An orange-coloured animal, possibly of the same genus. I. p. 550.

10. Clio borealis or C. limacina. I. 544.

11, 12. Clio helicina. I. 543.

13. Cancer boreas. I. 542.

14. Squilla.

15. Beautiful little animal brought up by the marine-diver. I. 545.

16, 17, 18, 19 and 20. Minute medusæ and animalcules. I. 545.

XVII. Representation of a singular accident that occurred in the whale-fishery. II. 368.

XVIII. Apparatus used in the Northern Whale-Fishery. [Scale one inch to a foot.]

1. Gun-harpoon. II. 229.

2. The harpoon. II. 223.

3. Gun-harpoon. II. 229.

4, 5, 6. Lances. II. 227.

7, 8, 9, 10. Blubber-spades. II. 299.

11, 12. Prickers. II. 309.

XIX. Apparatus used in the Northern Whale-Fishery.

1. Harpoon-gun. [Scale two inches to a foot.] II. 229.

2. Boat's Wince, or apparatus used in the whale-boats for heaving in the line when a great quantity has been withdrawn. [Scale an inch to a foot.] II. 233.

3. Hand-hooks. II. 308.

4. Ice-drill. II. 349.

5. Another form of a gun-harpoon.

6. Seal-club. An instrument by which seals are usually killed. I. 412.

7. King's fork. An instrument by which pieces of blubber are moved about from

No.

one place to another. To compensate in some degree, perhaps, for the laborious nature of the office of the person who uses it, he is honoured with the title of *King*.

XX. Apparatus used in the Northern Whale-Fishery. [Scale an inch to a foot.]

1. Blubber-knife. II. 299.
2. Chopping-knife. II. 309.
3. Strand-knife. II. 299.
4. Tail-knife. II. 233.
5. Bone-geer. II. 300.
6. Bone-wedge. II. 300.
7. Mik or rest for the harpoon. II. 233.
8. Third-hand. Used in flensing.
9. Pick-haak. II. 299. 308.
10. Closh, improved by my father. II. 308.
11. Grapnel. II. 233.
12. Ice-grapnel, used in warping.
13. Krenging-hook. II. 308.
14. Krenging-knife. II. 308.
15. Spurs. II. 298.
16. Axe. II. 233.
17. Snatch-block. II. 233.

XXI. Ice and fishing apparatus. [Scale an inch to a foot.]

1. Ice-axe. II. 349.

2, 3. Ice-anchors. II. 349.

4. Bay ice-anchor. The lower part of this anchor, near the *crown*, has a broad flat surface, by which it takes hold of a large portion of ice, and retains its hold, even in very thin ice, under a considerable strain. [Original.]

5. Blubber-pump. A pump used for taking the water out of such of the blubber casks as are filled for ballast. It is somewhat less in diameter than the bung-hole of the

No.

casks. When this pump ceases to act, on the water being nearly withdrawn, what little remains is removed by means of a *swab*.

6. Bone hand-spike. II. 300.
7. Ice-saw. The length of this saw, which is used for cutting ice, is 14 feet. Being too long to be represented wholly in the plate, a part of the middle of the instrument is left out. When used, two handles passing across each other, are put through the rings at the top, by which 12 to 16 men can be employed in working it at the same time. When a great extent of thick ice is to be cut, the larger saws are generally worked by ropes from the top of a tripod.
8. Another saw, with a moveable back, used for thinner ice. It is furnished with two parallel handles. The two parts of the saw being extended when in use, the back part serves to keep the lower extremity forward, and to preserve the saw in a perpendicular position.

XXII. Apparatus for cutting blubber.

1. Appearance of the cutting apparatus when fitted up for use. II. 310.
2. Horizontal section of the same. II. 310.

HYDROGRAPHICAL CHART OF THE ARCTIC REGIONS

CAPTAIN ROSS

ORIGINAL

STONE LANCE Found in a WHALE

Fig.1.

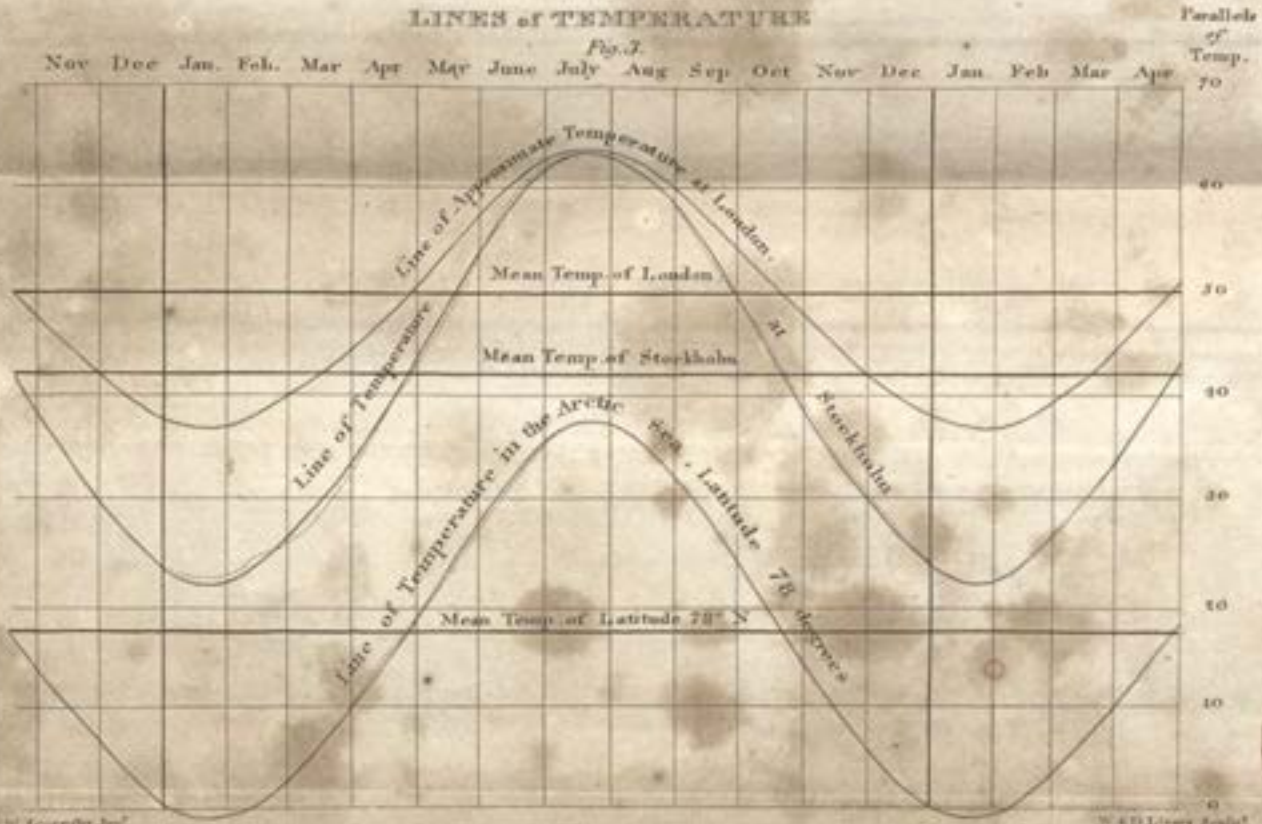
MARINE DIVER

Fig.2.

Fig.4. Improved MAGNETIC NEEDLE for a Compass

LINES of TEMPERATURE

Fig.3.


Nov Dec Jan. Feb. Mar Apr May June July Aug Sep Oct Nov Dec Jan. Feb Mar Apr
Parallels of Temp.
70
60
50
40
30
20
10
0
Line of Approximate Temperature at London.
Mean Temp. of London
Mean Temp. of Stockholm
Line of Temperature at Stockholm
Line of Temperature in the Arctic regs. Latitude 78 degrees
Mean Temp. of Latitude 78° N.

BIBLIOTECA CENTRALE BUREAUX FRANÇAIS OFFICIELS ASTRONAUTIQUE

APPEARANCES of SPITZBERGEN and adjacent ISLANDS.

PLATE III.

1. CHERIE or BEAR ISLAND, bearing E.S.E. distant 10 Miles.

2. THE THREE CROWNS, Situate at the Head of KING'S BAY, SPITZBERGEN, bearing E.S.E. distant 10 Leagues.

3. MIDDLE HOOK of the FORELAND or CHARLES' ISLAND, bearing E.b.S. 25 Miles. Elevation 4000 to 4500 feet.

4. HORN MOUNT and the LAND near HORN SOUND, SPITZBERGEN. Elevation of Horn Mount 4334 feet.

5. Appearance of the NORTH-WESTERNMOST LAND of SPITZBERGEN from HAKLUYT'S HEADLAND to the NORWAYS. *Hakluyt's Headland bear S.S.W. True; ** Main Land of Spitzbergen S.; *** Vogel Sang S.E.; * Norways uncertain; S.S.E.

A CHART OF SPITZBERGEN or East Greenland.

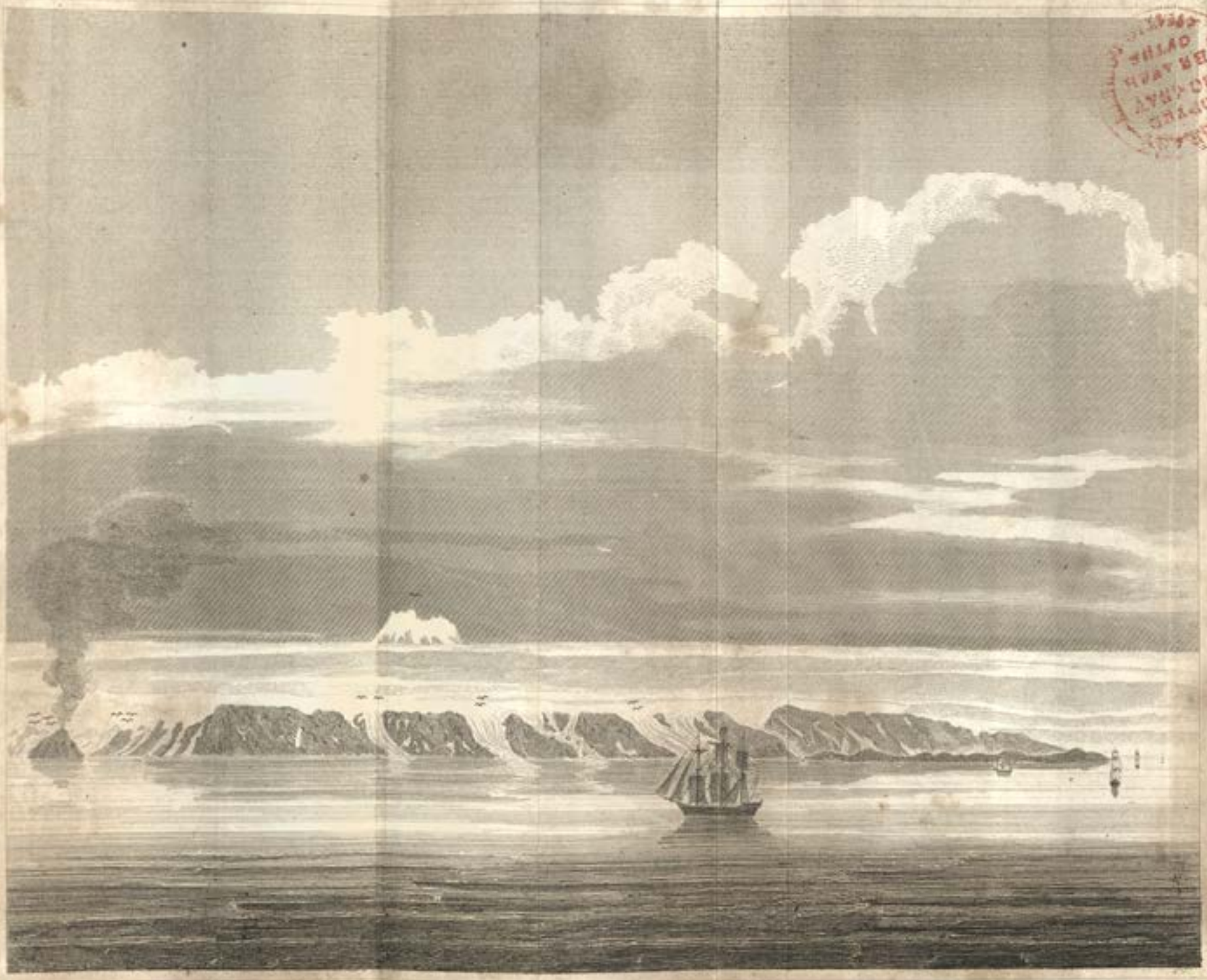
Comprising an ORIGINAL SURVEY of the WEST COAST. Above 200 Miles in Extent.

ADMIRALTY HYDROGRAPHICAL OFFICE 1 JUN 1875 LIBRARY

Surveyed & Drawn by W. Scoresby Junr

Engraved by W. Scoresby Junr

Edinburgh Published by Constable & Cº 1822.



Drawn by W. Scoresby Junr.

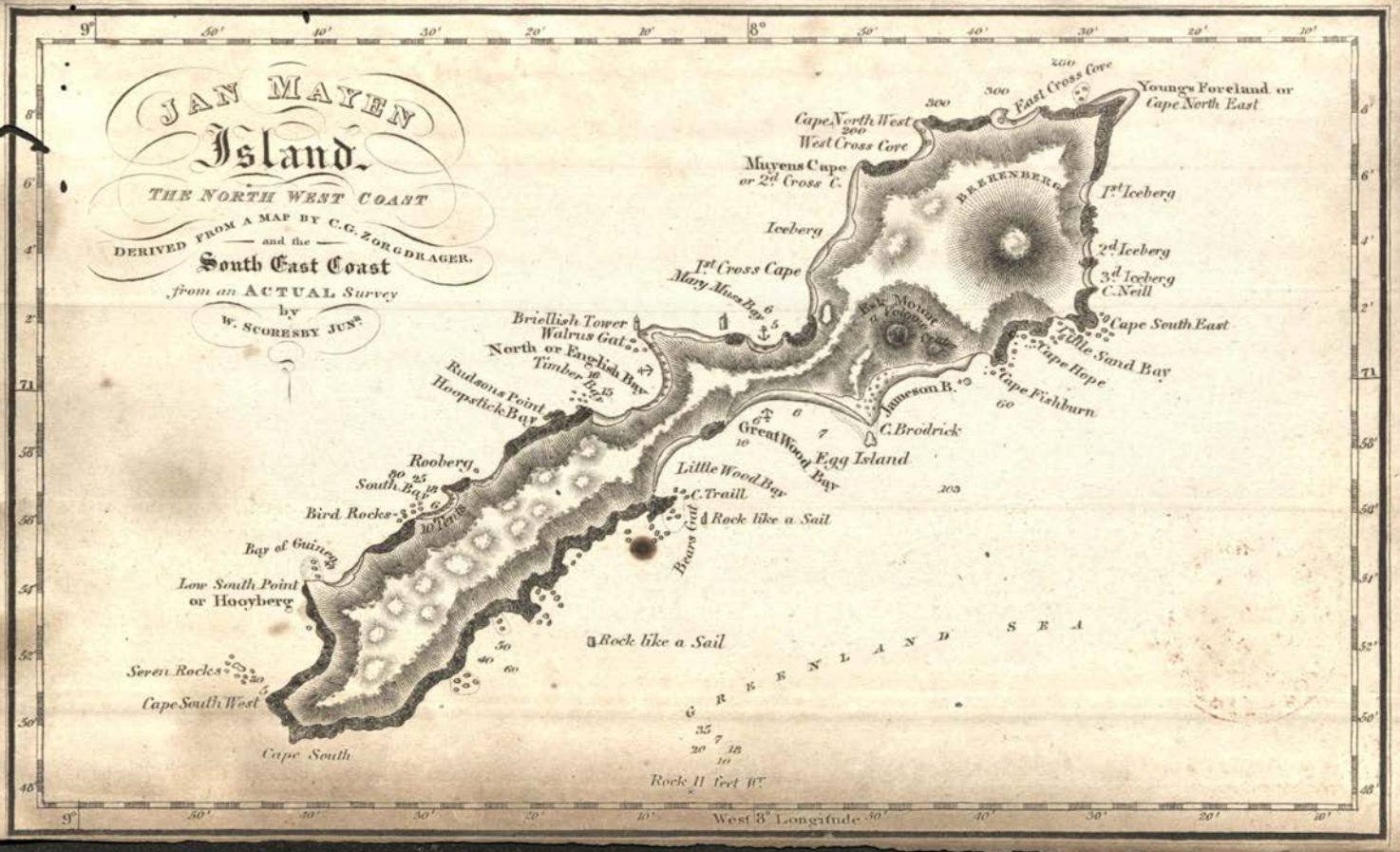
Elmes Sculpt. Edinburgh.

VIEW OF THE EAST COAST OF THE ISLAND OF JAN MAYEN,

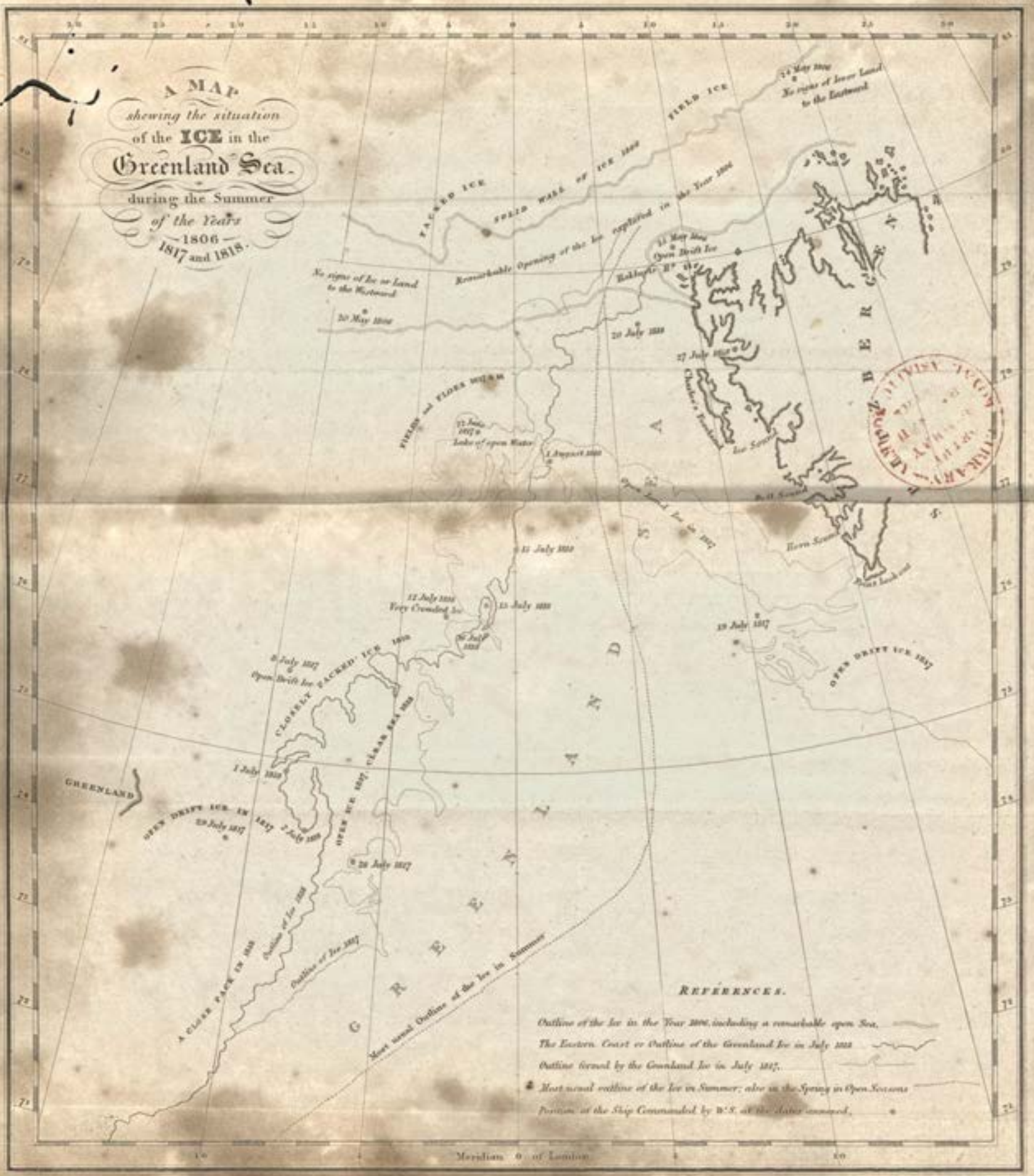
in which Beerenberg, appears above the region of the clouds.

The three Icebergs 1284 feet in height. Eske Mounte, a volcanic Crater. Bird Island from whence smoke was seen to issue in May 1818.

Beerenberg 6870 feet in altitude bearing due West, distant 10 miles.


JAN MAYEN
Island.
THE NORTH WEST COAST
DERIVED FROM A MAP BY C.G. ZORGDRAGER.
and the
South East Coast
from an ACTUAL Survey
by
W. SCORESBY JUNR.
Youngs Foreland or Cape North East
East Cross Cove
Cape North West
West Cross Cove
Muyens Cape or 2d Cross C.
BEERENBERG
1st Iceberg
2d Iceberg
3d Iceberg
C. Neill
Cape South East
Little Sand Bay
Cape Hope
Cape Fishburn
Iceberg
1st Cross Cape
Mary Muss Bay
Briellish Tower
Walrus Gat
North or English Bay
Timber Bay
Rudsons Point
Hoopstick Bay
Jameson B.
C. Brodrick
Great Wood Bay
Egg Island
Little Wood Bay
C. Traill
Rock like a Sail
Bears Gat
Rooberg
South Bay
Bird Rocks
10 Tents
Bay of Guinea
Low South Point or Hooyberg
Seven Rocks
Cape South West
Cape South
Rock like a Sail
GREENLAND SEA
Rock 11 feet W.
West 8° Longitude

A MAP
shewing the situation
of the **ICE** in the
Greenland Sea
during the Summer
of the Years
1806
1817 and 1818.



REFERENCES.

Outline of the Ice in the Year 1806, including a remarkable open Sea.

The Eastern Coast or Outline of the Greenland Ice in July 1806

Outline formed by the Greenland Ice in July 1817.

Most usual outline of the Ice in Summer; also in the Spring in Open Seasons

Position of the Ship Commanded by W.S. at the Dates annexed.

Fig. 1. a. 1/10 to 7/13.

Fig. 2. 1/10.

Fig. 3. a. 1/12.

Fig. 4. c. 1/15.

Fig. 5. 1/10.

Fig. 6. e. 1/20.

Fig. 7. d. 1/8.

Fig. 8. d. 1/30.

Fig. 9. f. 1/15.

Fig. 10. b. c. 1/20.

Fig. 11. d. 1/30.

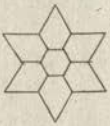


Fig. 12. f. 1/8.

Fig. 13. d. 1/40.

Fig. 14. e. 1/10.

Fig. 15. a. 1/10.

Fig. 16. b. 1/10.

Fig. 17. i. 1/15.

Fig. 18. a. 1/30.

Fig. 19. q. 1/12.

Fig. 20.

Fig. 21. q. 1/20.

Fig. 22. 1/20.

Fig. 23. g. 1/30.

Fig. 24. q. 1/30.

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Fig. 25. h. 2/20

Fig. 26. g. 1/20.

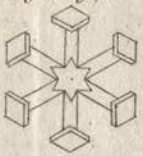

Fig. 27. h. 1/30.

Fig. 28. g. 1/30.

Fig. 29. i. k. 1/20

Fig. 30. g. 1/35.

Fig. 31. e. 1/8.

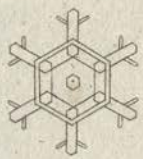

Fig. 32. e. 1/20.

Fig. 33. e. 1/15.

Fig. 34. k. 1/8.

Fig. 35. d. 1/20

Fig. 36. 1/20.

Fig. 37.

Fig. 38. e. 1/15.

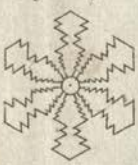

Fig. 39. n 1/15.

Fig. 40. n. 1/15.

Fig. 41. a. 1/15.

Fig. 42. d. o. 1/35 1/20.

Fig. 43 i. 1/10.

Fig. 44. i 1/30.

Fig. 45. h. 1/6

Fig. 46. 1/10. h.

Fig. 47. 1/30. i.

Fig. 48. h. 1/10.

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Fig. 49. r. 1/10.

Fig. 50. s. 1/10.

Fig. 51. r. 1/15.

Fig. 52. r. 1/10.

Fig. 53. r. 1/20.

Fig. 54. r. 1/15.

Fig. 55. s. 1/8.

Fig. 56. s. 1/8.

Fig. 57. s. 1/8.

Fig. 58. s. 1/12.

Fig. 59. s. 1/8.

Fig. 60. s. 1/8.

Fig. 61. s. 1/10.

Fig. 62. s. 1/8.

Fig. 63. s. 1/10.

Fig. 64. s. 1/10.

Fig. 65. s. 1/8.

Fig. 66. s. 1/10.

Fig. 67. s. 1/8.

Fig. 68. s. 1/15.

Fig. 69. s. 1/6.

Fig. 70. s. 1/10.

Fig. 71. s. 1/20.

Fig. 72. s. 1/10.

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Fig.73. t. 1/8.

Fig.74. m. 1/30.

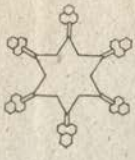

Fig.75. m. 1/35.

Fig.76. m. 1/25.

Fig.77. m. 1/15.

Fig.78. l. 1/10.

Fig.79. n. 1/15.

Fig.80. m. 1/20.

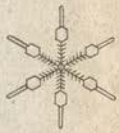

Fig.81. o. 1/15.

Fig.82. o. 1/20.

Fig.83. o. 1/10.

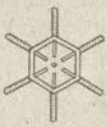

Fig.84. o. 1/8.

Fig.85. o. 1/25.

Fig.86. p. 1/10.

Fig.87 n. 1/30.

Fig.88. n. 1/30.

Fig.89. p. 1/15.

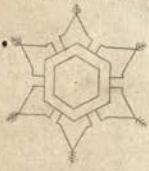

Fig.90. o. 1/20.

Fig.91. n. 1/10.

Fig.92. o. 1/10.

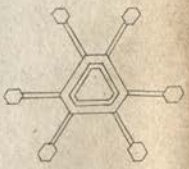

Fig.93. s. 1/10.

Fig.94.

Fig.95. e. 1/15.

Fig.96. g. 1/20.

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Fig.1. BALÆNA MYSTICETUS, or COMMON WHALE.

58 Feet long.

The Mouth being open shows the position of the Whalebone.

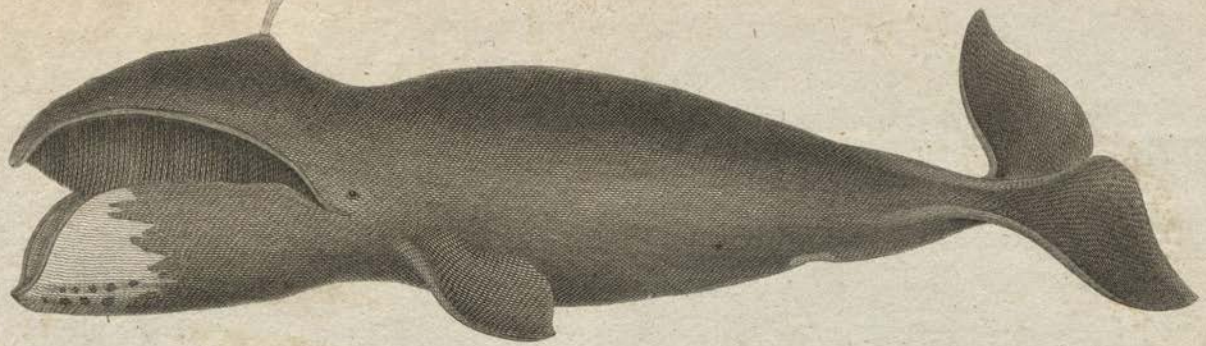

Fig.2. CUB of the COMMON WHALE 17 Feet long.

Fig.3. NARWAL. Length exclusive of the Tusk 14 Feet.

ROYAL ASIATIC SOCIETY BOMBAY BRANCH

Scale, One-tenth of Inch to a Foot.

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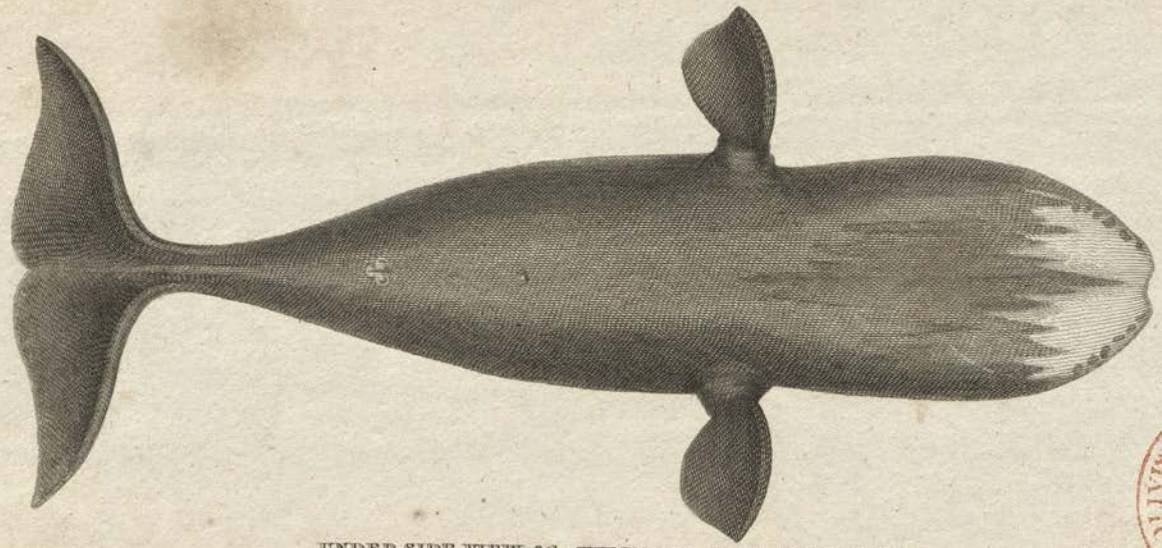
BALÆNA MYSTICETUS.



UNDER SIDE VIEW of the FEMALE WHALE. Length 58 Feet.

ROYAL SCOTTISH SOCIETY OF ARTS

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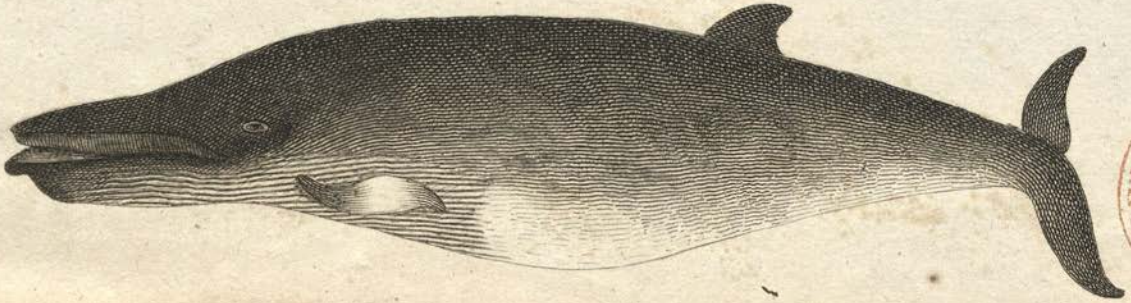
DELPHINUS DEDUCTOR.

Length 20 Feet.

Fig. 1.

BALÆNA ROSTRATA.

Fig 2.



ROYAL SOCIETY OF EDINBURGH

From Drawings by the late James Watson Esqr of Orkney.

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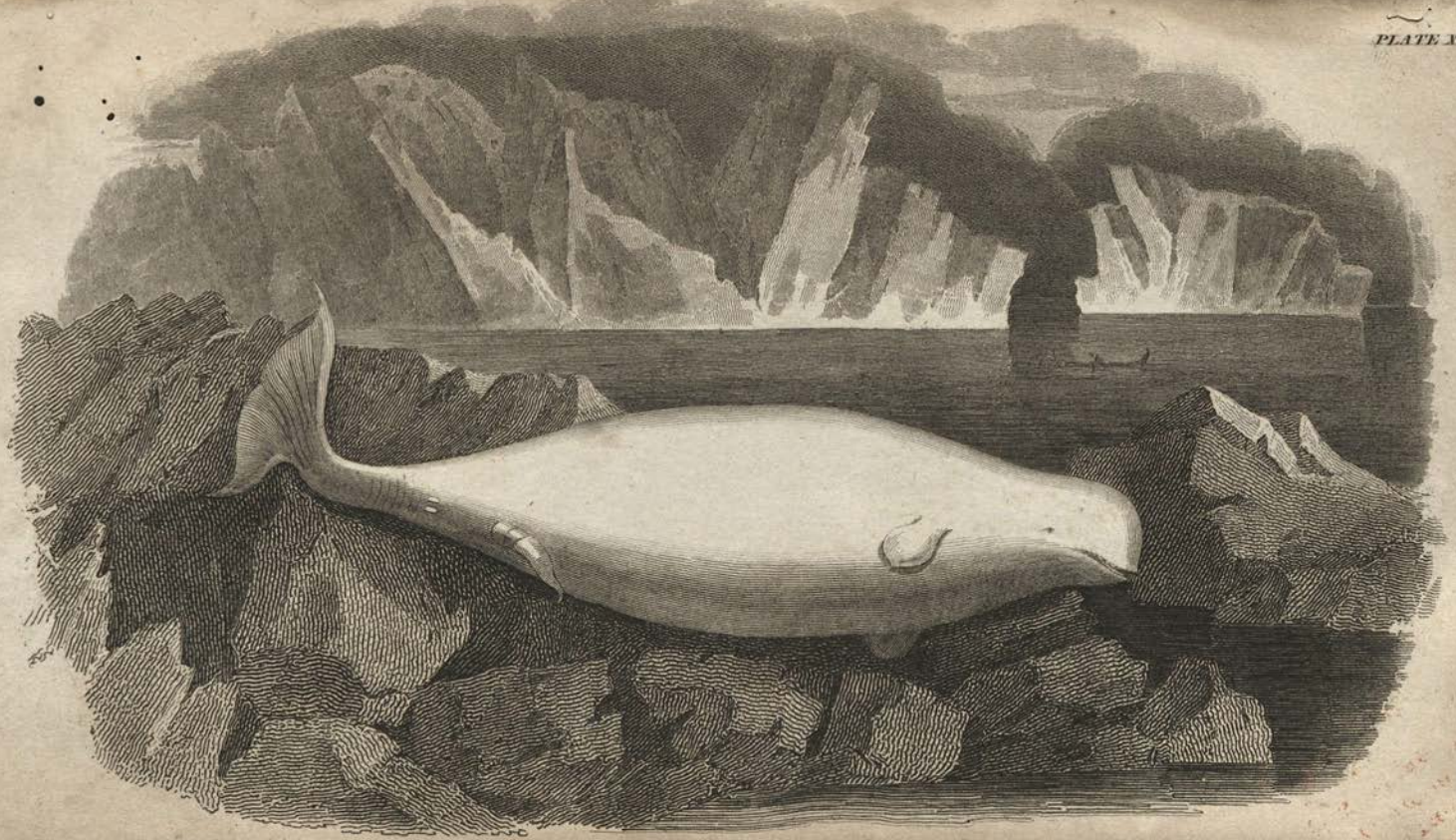
W. & D. Lizars Sculp.



From an Original Drawing by P. Syme Esqr.

W. & D. Lizars Sculp.

BELUGA or WHITE WHALE.

Fig.1. MALE NARWAL, or UNICORN. 15 Feet in Length.

Fig.2. UNDER SIDE VIEW of the same NARWAL.

Fig.5. The eye of the Greenland Shark.

Fig.4. UNDER SIDE VIEW of the GREENLAND SHARK.

Fig.3. GREENLAND SHARK, 12½ Feet in Length.

ASIATIC SOCIETY

Fig. 1.

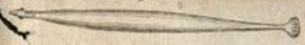


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

LIBRARY
OF THE
BOMBAY
BRANCH
OF THE
ASIATIC

Fig. 6.

Fig. 10.

Fig. 7.

Fig. 8.

Fig. 11.

Fig. 9.

Fig. 12.

Fig. 13.

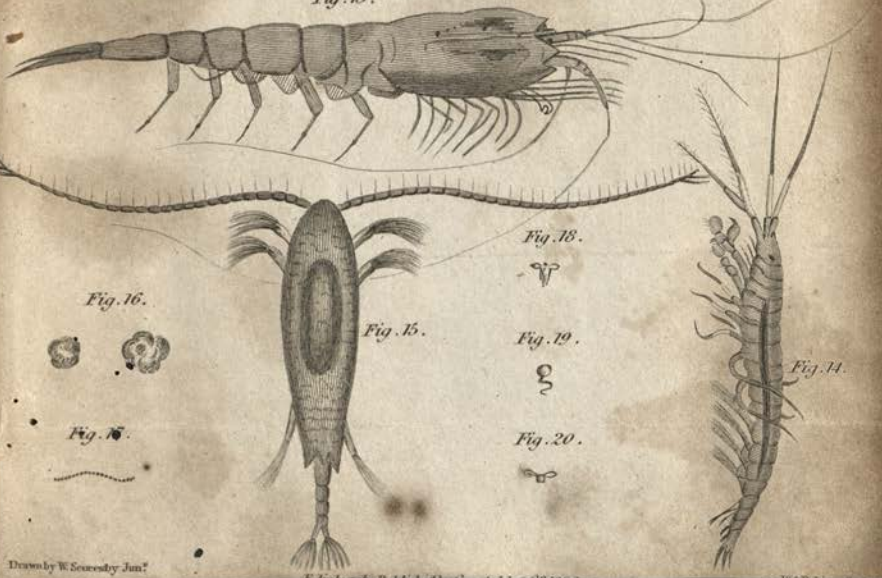


Fig. 18.

Fig. 16.

Fig. 15.

Fig. 19.

Fig. 14.

Fig. 17.

Fig. 20.

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INSTRUMENTS used in the WHALE FISHERY.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

Fig. 1.

Fig. 2.

Stock 7 Feet long.

Fig. 3.

Fig. 4.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 5.

Fig. 9.

Fig. 12.

Fig. 11.

Fig. 10.

Drawn by W. Scoresby Junr.

Scale, One Inch to a Foot.

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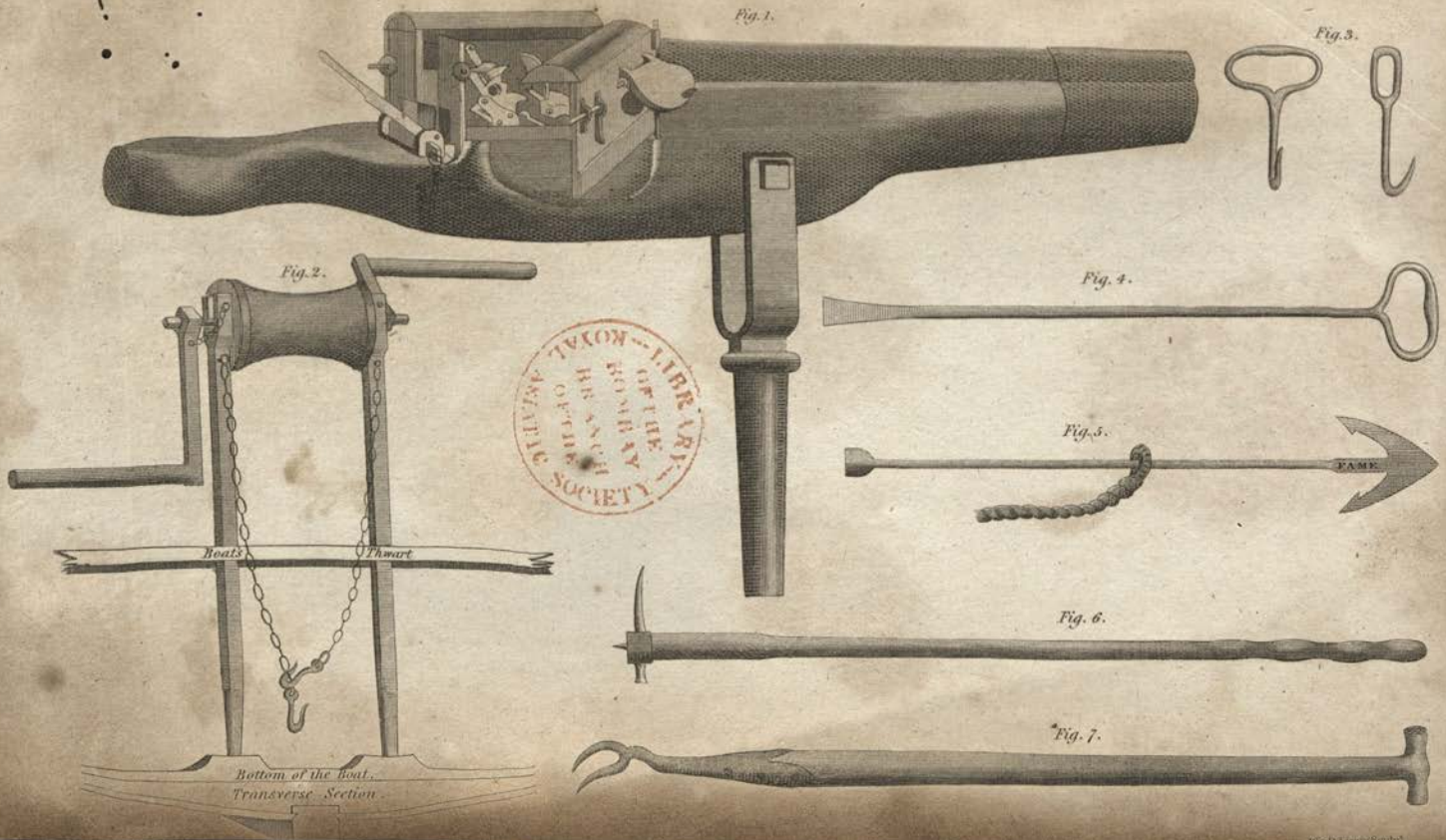
APPARATUS used in the NORTHERN WHALE FISHERIES.

PLATE 19



LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

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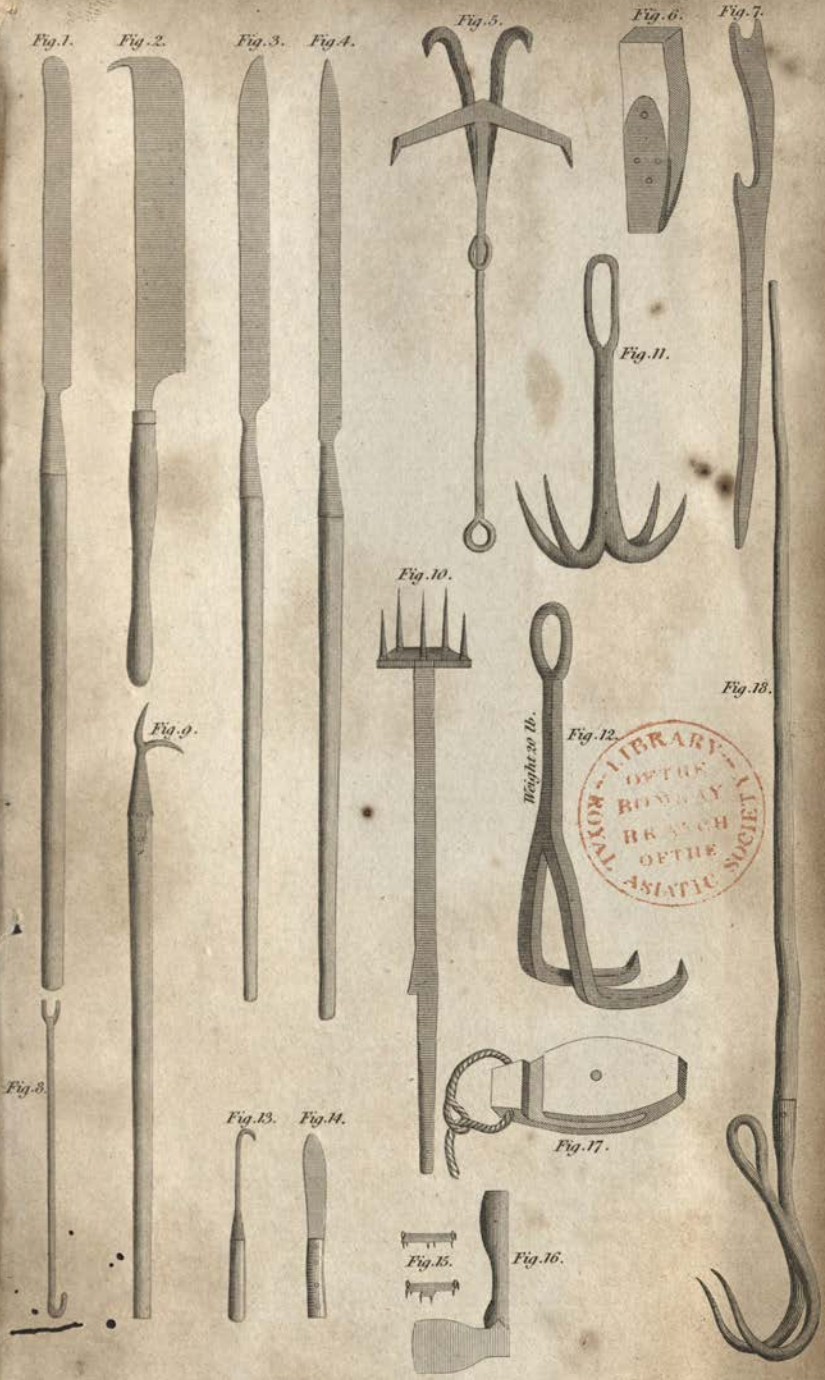
APPARATUS used in the WHALE FISHERY. PLATE X.



LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

Scale, One Inch to a Foot.

...wn by W. Scoresby Jun.r

W. & D. Lizars Sculp.t

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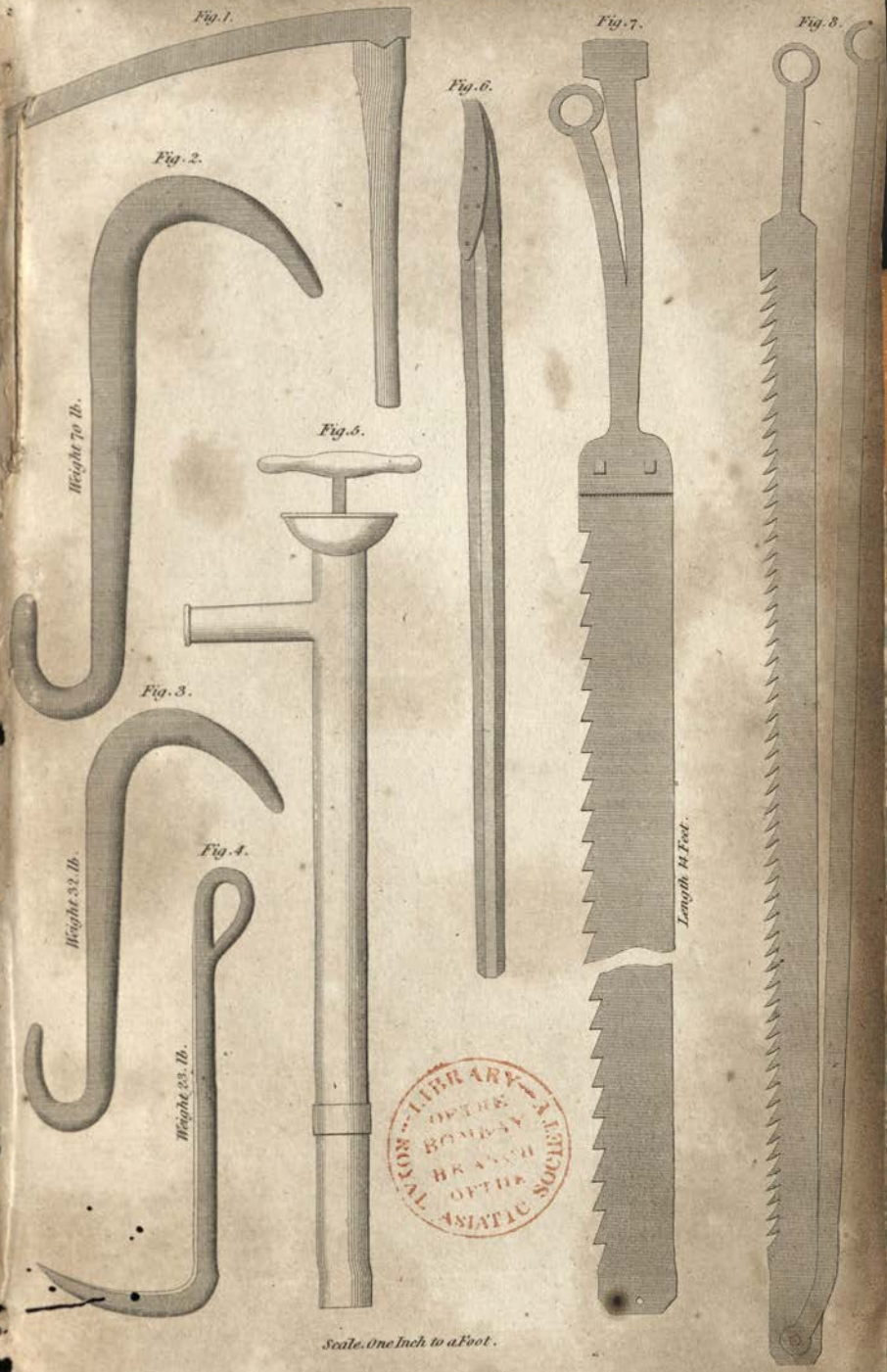


ROYAL ASIATIC SOCIETY LIBRARY OF THE BOMBAY BRANCH

Scale. One Inch to a Foot.

Edinburgh. Published by Constable & Co. 1820.

W. & D. Lizars Sculp.

...by W. Scoresby Junr.

APPARATUS for CUTTING BLUBBER.

Fig. 1.

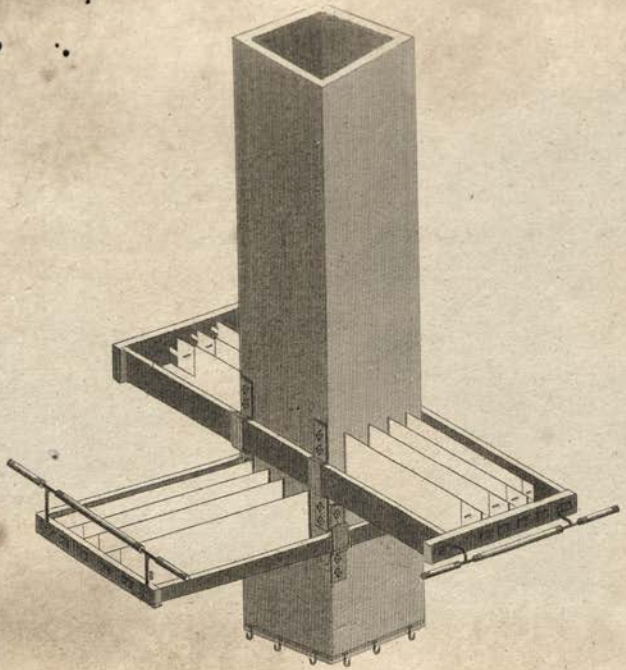
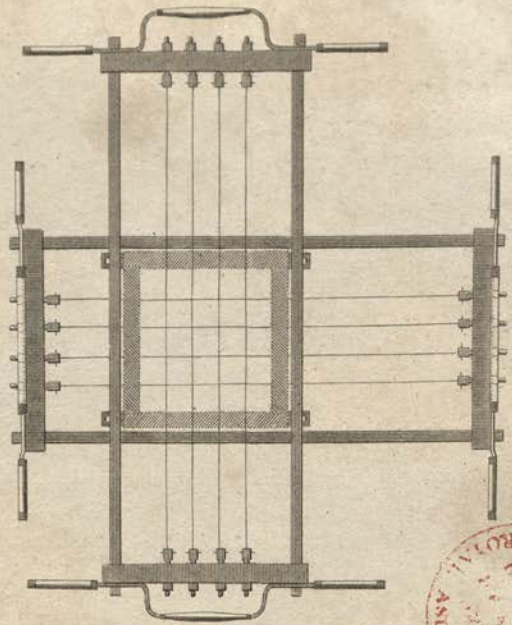


Fig. 2.



TAYLOR-LIBRARY OF THE BRANCH OF THE ASIATIC SOCIETY

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ADDENDA ET CORRIGENDA.

After the Note, at the foot of page 47, Vol. I. *add*, See Appendix to this Volume, No. III. *b*.

Page 124, Vol. I. line 17, *after* every ninety, *add*, or one hundred

—— 125, Vol. I. after the note at the foot of the page, *add*, See Appendix to this Volume, No. III. *b*.

—— 151, line 16. *for* 20° *read* 22°

—— 92, Vol. II. Note, line 1. instead of the words, which contain, *read*, and

—— 191, Vol. II. line 9, *after* following manner, *add*, or according to the plan described in Appendix, No. II. 2.

—— 377, Vol. II. line second of note, *for* first volume, *read* Appendix to this Volume.

—— 416, Vol. II. line 13. *for* 300, *read* 320.

—— 500, Vol. II. line 20. *for* 49th Geo. III. c. 98. *read*, 59th Geo. III. c. 52.

TO THE BINDER.

Let the View of the Ship Esk damaged by Ice, be placed as Frontispiece to Vol. I.; and Plate XVII. representing a Boat with its Crew projected into the Air by a Blow from a Whale, as Frontispiece to Vol. II. The other Plates, amounting to Twenty-Two, (No. XII. being repeated), may be placed in Numerical order at the conclusion of the Second Volume.

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